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WADC TECHNICAL REPORT 53-12

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## ANTHROPOMETRY OF WAF BASIC TRAINEES

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JULY 1953

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Statement A  
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WRIGHT AIR DEVELOPMENT CENTER

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## ANTHROPOMETRY OF WAF BASIC TRAINEES

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*July 1953*

*Contract No. AF 18 (600)-30  
RDO No. 695-71*

Wright Air Development Center  
Air Research and Development Command  
United States Air Force  
Wright-Patterson Air Force Base, Ohio

FOREWORD

The material presented in this report was compiled by the Anthropology Section, Biophysics Branch, Aero Medical Laboratory, under the authority of Research and Development Order 695-71 entitled "Anthropometry of USAF Personnel", and by Antioch College, Yellow Springs, Ohio, under Contract No. AF 18(600)-30. The project scientist was Gilbert S. Daniels, 1st Lt USAF (MSC).

## **ABSTRACT**

Body size data for 63 measurements of 852 Women's Air Force basic trainees are presented for use by the designers of Air Force equipment.

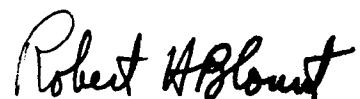
The statistics reported for each measurement include; the mean, standard deviation, coefficient of variation, standard errors of these statistics, range, and selected percentiles from the first to the ninety-ninth. In general, these statistics are reported in both the metric and English values.

A complete description of the anthropometric techniques used is presented.

## **PUBLICATION REVIEW**

This report has been reviewed and is approved.

FOR THE COMMANDER:



ROBERT H. BLOUNT  
Colonel, USAF (MC)  
Chief, Aero Medical Laboratory  
Directorate of Research

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## ANTHROPOMETRY OF WAF BASIC TRAINEES

### INTRODUCTION

In mid-1950 an anthropometric survey was conducted among Air Force flying personnel to gather information on body size and proportion for this specialized group. The results of this survey were published in summary form in WADC Technical Report 52-321, Anthropometry of Air Force Flying Personnel (1950). The information made available in this report finds extensive use in the solution of many problems of human fit, whether it be clothing, personal equipment, or some phase of the ever-increasing man-machine complex.

In March 1952 the Clothing and Equipage subdivision of the Air Materiel Command requested that similar information be made available on WAF's\*. For the survey it was decided to limit the subjects to be measured to WAF personnel in basic training. This was done for two reasons: first, only at Lackland Air Force Base where WAF basic training is carried out could a sufficient concentration of WAF personnel be found to make such a survey possible. Secondly, it was the WAF basic trainee who was of most interest to the AMC since the greatest issue of clothing items to WAF personnel takes place during basic training.

From 17 July through 1 August 1952 the actual job of measuring the subjects was carried out under the supervision of Lt. G. S. Daniels and Capt. H. C. Meyers, Jr., of the Anthropology Section of the Aero Medical Laboratory, Wright Air Development Center.

The information gathered was transferred from the field recording blanks to IBM punch cards at Wright Air Development Center. These cards

\* Women's Air Force

were then turned over to the Anthropometric Project of Antioch College, Yellow Springs, Ohio, where the data were analyzed under the provisions of Contract No. AF 18 (600) - 30.

Many thanks are due to the WAF personnel who did the measuring and recording of the data, and particularly to Lt. Col. D. Angst and Major M. Dockray of the 3700th WAF Training Squadron, Lackland Air Force Base, Texas, for their cooperation in the project. Thanks are also due to Mr. K. Takahashi and Miss Doris Thiele of the contractor's staff for their efforts in the preparation of the statistical data for publication.

The authors wish also to thank Mr. H.T.E. Hertzberg, Chief of the Anthropology Section, for his support in the planning and preparation of this report.

## SECTION I

### THE SAMPLE

This report concerns WAF basic trainees. Being in basic training is the only thing that was common to all the girls who were measured in this anthropometric survey. Should these data be used for any purpose other than the design of items for use by WAF basic trainees, the following information should be considered.

<u>Group</u>	<u>Rank</u>	Number = 851
Airmen Basic	786	92.36
Airmen Third Class	62	7.29
Airmen Second Class	3	.35

Not all the girls measured were in service for the first time. The sixty-five girls who were either Airmen 3rd class or Airmen 2nd class were re-enlistees in the Air Force, or girls who had previous military duty in one of the other services.

The educational level of the WAF personnel measured was recorded as the highest grade completed by each girl. Special training was considered as some course beyond the high school level such as secretarial or some type of technician's training.

<u>Group</u>	<u>Education</u>	Number = 852
Grade School	129	15.13
High School	652	76.48
Special Training	15	1.76
College (completed)	9	1.06
Professional	2	.23
One Year College	18	2.11
Two Years College	22	2.58
Three Years College	5	.59

The data for religion, marital status, and race are self-explanatory.

<u>Group</u>	<u>Religion</u>	Number = 849
Protestant	621	73.14
Catholic	215	25.32
Jewish	6	.71
Other	7	.82

<u>Group</u>	<u>Marital Status</u>	Number = 852
Single	812	95.30
Married	2	.23
Divorced or separated	36	4.23
Widowed	2	.23

<u>Group</u>	<u>Race</u>	Number = 852
White	735	86.29
Negro	111	13.03
Indian	5	.59
Mongoloid	1	.12

Data on regional and national origins of the subjects and their parents are given in Table I. Distribution by age is shown in Table II.

TABLE I

BIRTHPLACE

<u>Group</u>	<u>Birthplace of Subject</u> <u>Number=852</u>	<u>Birthplace of Father</u> <u>Number=826</u>	<u>Birthplace of Mother</u> <u>Number=830</u>
New England States Me., N.H., Vt., Mass., R.I., Conn.	118 13.84%	81 9.72%	95 11.40%
Mid-Atlantic States N.Y., N.J., Pa.	173 20.29%	134 16.08%	152 18.24%
South-Atlantic States Del., Md., D.C., Va., W.Va., N.C., S.C., Ga., Fla.	140 16.42%	147 17.64%	136 16.32%
East North Central States Ohio, Ind., Ill., Mich., Wis.	148 17.36%	116 13.92%	111 13.32%
East South Central States Ky., Tenn., Miss., Ala.	76 8.91%	94 11.28%	99 11.88%
West North Central States Minn., Iowa, Mo., N.D., S.D., Neb., Kans.	56 6.57%	62 7.44%	56 6.72%
West South Central States Ark., La., Okla., Texas	67 7.86%	63 7.56%	70 8.40%
Mountain States Mont., Idaho, Wyo., Colo., Utah, Nev., Ariz., N.M.	27 3.17%	17 2.04%	27 3.24%
Pacific Coast States Cal., Ore., Wash.	41 4.81%	13 1.56%	16 1.92%
Foreign Born	6 .70%	99 11.88%	70 8.40%

TABLE II

AGE

Number - 852

<u>Age (Last Birthday)</u>	<u>Frequency</u>	<u>Percentage</u>
18	354	41.55
19	202	23.83
20	92	10.80
21	63	7.39
22	49	5.75
23	20	2.35
24	18	2.11
25	9	1.06
26	9	1.06
27	7	.82
28	9	1.06
29	7	.82
30 - 34	13	1.51

Mean:  $19.79 \pm .09$  yrs.Standard Deviation:  $2.71 \pm .07$  yrs.Coefficient of Variation:  $13.70 \pm .33\%$

## SECTION II

### TECHNIQUES OF MEASUREMENT

From the first planning of the Anthropometric Survey of basic trainees, it was felt that some special techniques would be necessary to carry out the program with a minimum of personnel and to finish in a reasonable period of time.

The survey blank (Figure 1) was planned for the eventual transfer of all information to IBM punch cards for statistical analysis. Since all material on a punch card is readily available no matter where the information appears on the card, it was unnecessary to group the data on the blank in any way by anatomical areas or planned use of the material. Position on the blank was determined solely for ease and efficiency of use by the measurer. Thus tape measurements appear in one group and caliper measurements in another. Head measurements as such appear in a number of places. Similarly, measurements made on a standing subject are grouped separately from measurements made on a sitting subject although the measurements may have been made with the same instrument.

The actual survey team consisted of a supervisor and eight measurers. The eight measurers were subdivided into four working teams of two each. The survey blank was divided into four portions requiring equal times to complete and one section was permanently assigned to each of the working teams for the remainder of the survey. Each member of the working team alternately measured and recorded in order to minimize fatigue. A woman being measured proceeded through the four teams in production line fashion: carrying her blank with her, having it filled in at each stop and finally relinquishing it at the last measuring team. When working at peak speed it was possible to process subjects at the rate of one every two minutes entering the "production line".

**ANTHROPOMETRIC SURVEY BLANK**

No. 

1	2	3	4
---	---	---	---

DATE \_\_\_\_\_

NAME \_\_\_\_\_ LAST \_\_\_\_\_ FIRST \_\_\_\_\_ MIDDLE \_\_\_\_\_

SERIAL NO. \_\_\_\_\_

RANK \_\_\_\_\_

AFSC \_\_\_\_\_

AGE \_\_\_\_\_ (LAST BIRTHDAY)

BIRTHPLACE OF SUBJECT \_\_\_\_\_ (GIVE STATE IF NATIVE BORN;  
COUNTRY IF FOREIGN BORN)

BIRTHPLACE OF FATHER \_\_\_\_\_ (" " " " )

BIRTHPLACE OF MOTHER \_\_\_\_\_ (" " " " )

RELIGION \_\_\_\_\_

RACE \_\_\_\_\_

EDUCATION \_\_\_\_\_ (HIGHEST GRADE COMPLETED)

MARITAL STATUS \_\_\_\_\_

5					
6	7	8	9	10	
					11 12
					13
					14
					15
					16
					17
					18
					19

WCR FORM 84  
22 APR 52

AF-WP-L-23 MAY 52 EM

Chest (over)  
Chest (under)  
Strap Length  
Internipple

No. 

1	2	3	4
---	---	---	---

WEIGHT \_\_\_\_\_ 

20	21
----	----

  
 NECK CIRC. \_\_\_\_\_ 

22	23
----	----

  
 SHOULDER CIRC. \_\_\_\_\_ 

24	25
----	----

  
 CHEST CIRC. Bust \_\_\_\_\_ 

26	27
----	----

  
 CHEST CIRC. \_\_\_\_\_ 

28	29
----	----

  
 WAIST CIRC. \_\_\_\_\_ 

30	31
----	----

  
 BUTTOCK CIRC. \_\_\_\_\_ 

32	33
----	----

  
 THIGH CIRC. \_\_\_\_\_ 

34	35
----	----

  
 LOWER THIGH CIRC. \_\_\_\_\_ 

36	37
----	----

  
 CALF CIRC. \_\_\_\_\_ 

38	39
----	----

  
 ANKLE CIRC. \_\_\_\_\_ 

40	41
----	----

  
 BALL OF FOOT CIRC. \_\_\_\_\_ 

42	43
----	----

  
 ARM SCYE \_\_\_\_\_ 

44	45
----	----

  
 AXILLARY ARM CIRC. \_\_\_\_\_ 

46	47
----	----

  
 BICEPS CIRC. (FLEXED) \_\_\_\_\_ 

48	49
----	----

  
 ELBOW CIRC. (FLEXED) \_\_\_\_\_ 

50	51
----	----

  
 LOWER ARM CIRC. (FLEXED) \_\_\_\_\_ 

52	53
----	----

  
 WRIST CIRC. \_\_\_\_\_ 

54	55
----	----

  
 PALM CIRC. \_\_\_\_\_ 

56	57
----	----

  
 FIST CIRC. \_\_\_\_\_ 

58	59
----	----

  
 SLEEVE INSEAM \_\_\_\_\_ 

60	61
----	----

  
 SLEEVE LENGTH \_\_\_\_\_ 

62	63
----	----

  
 SHOULDER LENGTH \_\_\_\_\_ 

64	65
----	----

  
 BIACROMIAL ARC \_\_\_\_\_ 

66	67
----	----

  
 WAIST BACK \_\_\_\_\_ 

68	69
----	----

  
 WAIST FRONT TO CERVICALE \_\_\_\_\_ 

70	71
----	----

  
 GLUTEAL ARC \_\_\_\_\_ 

72	73
----	----

  
 CROTCH LENGTH \_\_\_\_\_ 

74	75
----	----

  
 VERTICAL TRUNK CIRC. \_\_\_\_\_ 

76	77
----	----

  
 CHEST BREADTH \_\_\_\_\_ 

78	79
----	----

HEAD CIRC. _____	5	6
SAGITTAL ARC. _____	7	8
CORONAL ARC. _____	9	10
POSTERIOR ARC. _____	11	12
INTERSCYE (S). _____	13	14
INTERSCYE MAX. (S) _____	15	16
HIP CIRC. (S) _____	17	18
KNEE CIRC. (S) _____	19	20
STATURE. _____	21	22
CERVICALE HT. _____	23	24
ACROMIAL HT. _____	25	26
AXILLA HT. _____	27	28
WAIST HT. _____	29	30
GLUTEAL SEAM HT. _____	31	32
CROTCH HT. _____	33	34
PATELLA HT. _____	35	36
CALF HT. _____	37	38
ANKLE HT. _____	39	40
HAND LENGTH. _____	41	42
PALM LENGTH. _____	43	44
HAND BREADTH AT METACARPAL. _____	45	46
HAND BREADTH AT THUMB. _____	47	48
THICKNESS AT METACARPAL III. _____	49	50
HEEL WIDTH. _____	51	52
FOOT WIDTH. _____	53	54
INSTEP LENGTH. _____	55	56
FOOT LENGTH. _____	57	58
HEAD LENGTH. _____	59	60
HEAD BREADTH. _____	61	62
HIP BREADTH. _____	63	64

Figure I - SURVEY BLANK

In order to simplify the operation of measuring, it was necessary to supplement the standard anthropometric instruments (anthropometer, sliding caliper, spreading caliper, tape). An oversized sliding caliper was made for use in measurements involving large body diameters such as chest width, and a special instrument was designed for measuring sleeve inseam. All of these instruments are shown in Figure 2.

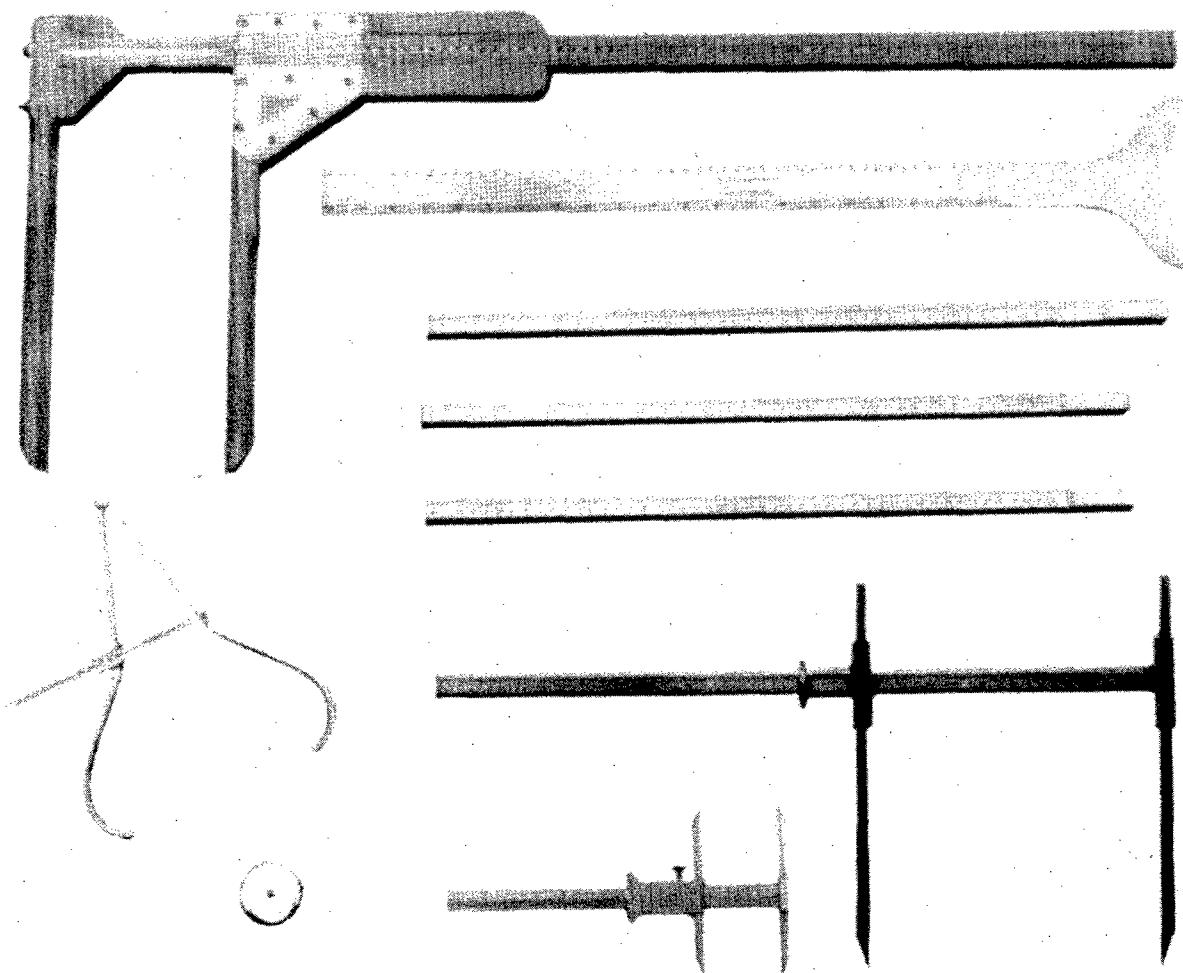


Figure 2 - MEASURING INSTRUMENTS

Foot length, instep length, and foot width were taken by means of a special foot board and ankle heights were taken by means of a graduation on vertical blocks (Figure 3).

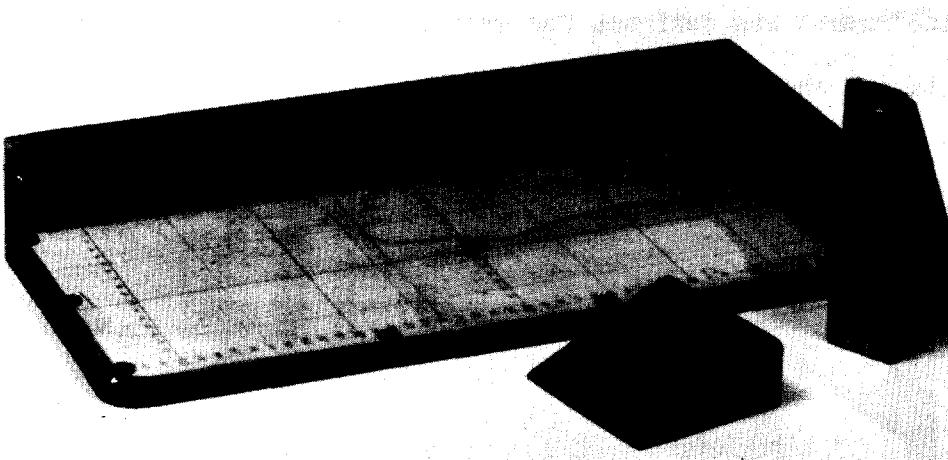
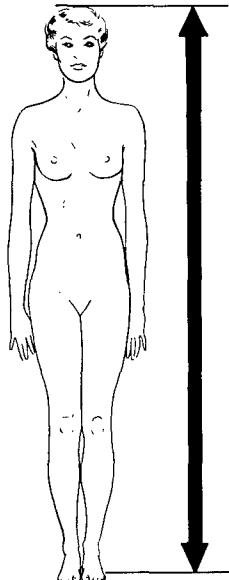


Figure 3 - FOOT BOARD AND GRADUATED BLOCKS

For convenience in making the measurements, certain anatomical points were marked on the subjects before measuring was started. A drawing showing the locations of these points along with a glossary of anatomical terms used in this report appear on pages 99 and 100. All measurements were made with the subjects wearing brassieres and panties.

The exact technique involved in each measurement, together with schematic illustrations of the measurements, follows:

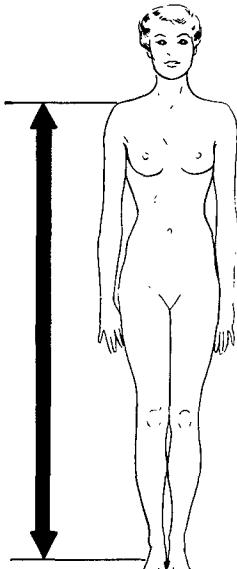
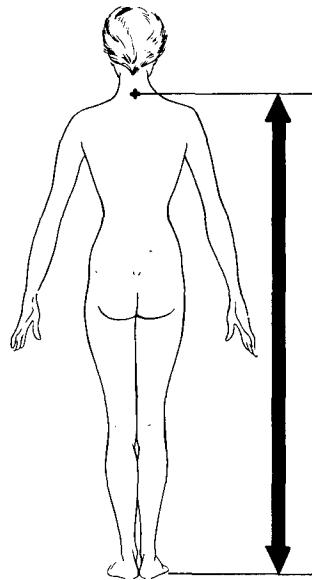


#### STATURE

The subject stands erect with her hands at her sides facing forward (the head in the Frankfort plane). Measure from the floor to the top-most point of the head with the anthropometer slide firmly touching the scalp.

#### CERVICALE HEIGHT

Subject stands. Measure from the floor to the marked cervicale point with the anthropometer.

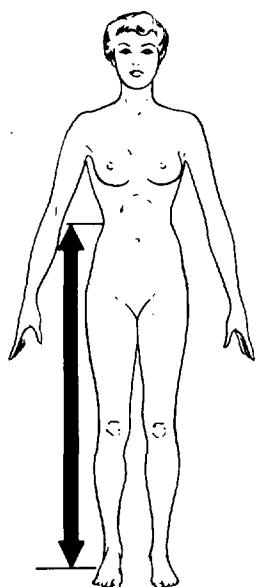
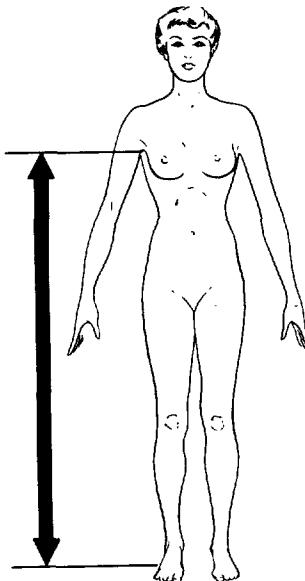


#### ACROMIAL HEIGHT

Subject stands erect. Measure from the floor to the marked acromion point on the right side with the anthropometer.

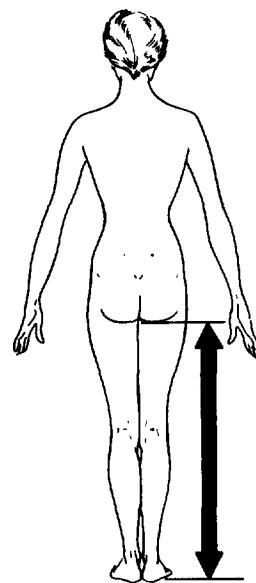
#### AXILLA HEIGHT

Subject stands with her arms raised slightly. The cross bar of the anthropometer is raised until it comes just under the right armpit. The subject then lowers her arms. Care is taken that both shoulders are level before reading the anthropometer.



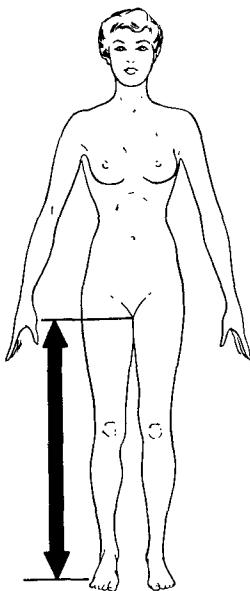
#### WAIST HEIGHT

Subject stands erect. Measure from the floor to the marked waist line on the right side with the anthropometer.



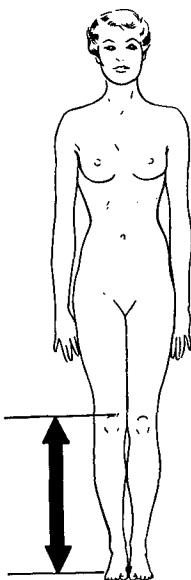
#### GLUTEAL FURROW HEIGHT

Subject stands. Measure from the floor to the lowest point of the gluteal furrow below the right buttock with the anthropometer.



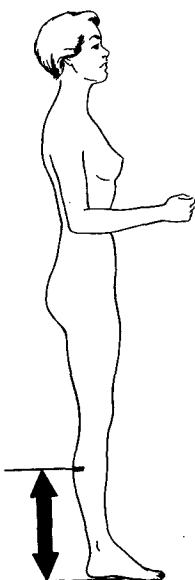
#### CROTCH HEIGHT (INSEAM)

Subject stands with her legs slightly apart. Measure from the floor to the highest point in the crotch. This measurement is made from the front of the subject with the anthropometer.



#### PATELLA HEIGHT

Subject stands. Measure from the floor to the upper edge of the right knee cap with the anthropometer.

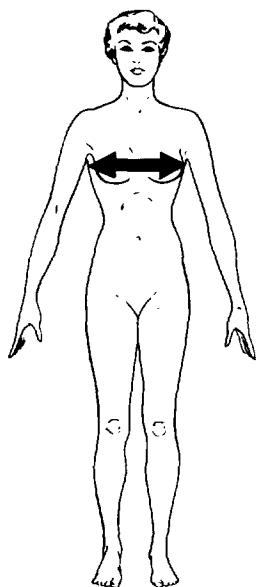
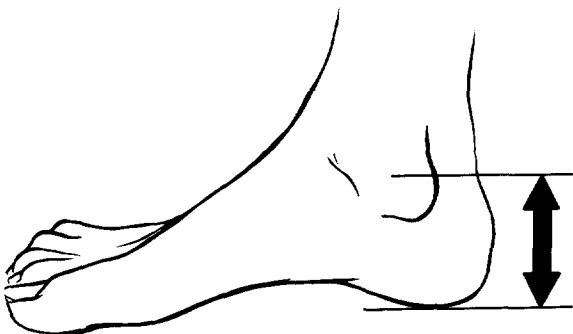


#### CALF HEIGHT

Subject stands. With the anthropometer measure the height from the floor to the marked point on the right calf.

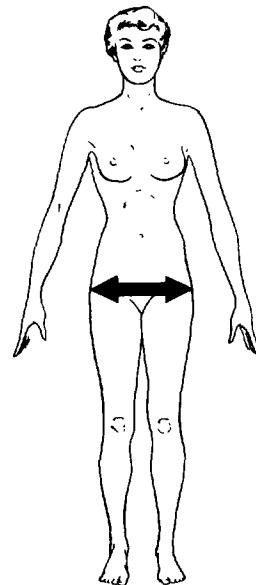
#### ANKLE HEIGHT

Subject stands, preferably on a table, with weight equally distributed on both feet and the right foot slightly forward. The measurement is taken by means of a special block having a scale perpendicular to the table top. Bring the surface of the block against the medial ankle bone of the right foot and measure the height to the center of the area of tangency with the ankle bone to the nearest half-centimeter.



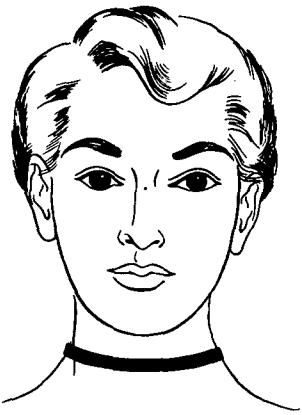
#### CHEST BREADTH

Subject stands erect with her arms slightly raised. Measure the chest breadth with the anthropometer caliper held horizontally at the level of the nipples, after the subject's arms have been lowered.



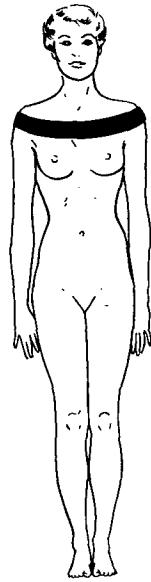
#### HIP BREADTH

Subject stands. Measure across the widest portion of the hips with the anthropometer held horizontally.



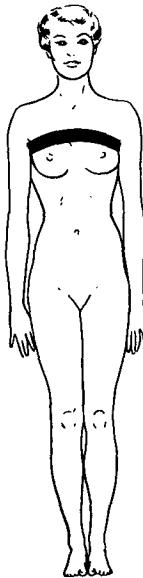
#### NECK CIRCUMFERENCE

Subject stands. Measure around the neck with the tape held in a horizontal plane and passing just below the thyroid cartilage.



#### SHOULDER CIRCUMFERENCE

Subject stands. Hold the tape horizontally and passing over the maximum lateral portion of the deltoid muscles.

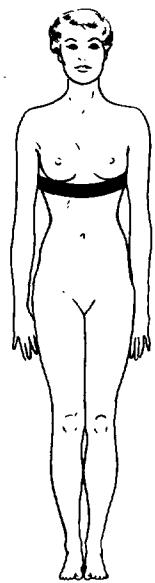
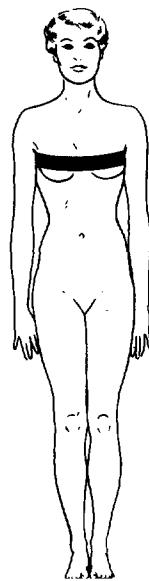


#### CHEST CIRCUMFERENCE (OVER)

Subject stands. Her arms are raised and the tape is placed across the back at the level of the nipples, but is brought across the front above the fullness of the breasts. Record the measurement at the maximum dimension during normal breathing.

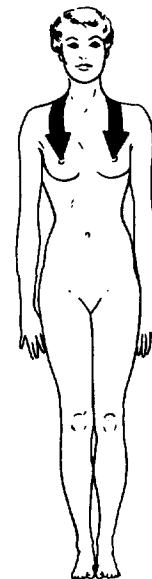
### BUST CIRCUMFERENCE

Subject stands. Her arms are raised and the tape is placed in a horizontal position at the level of the nipples. The arms are then lowered over the tape. Record bust circumference at the maximum dimension during normal breathing.



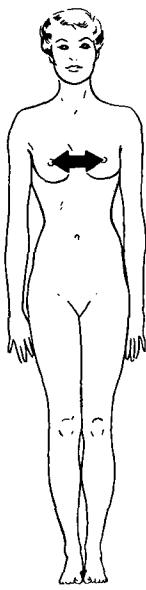
### CHEST CIRCUMFERENCE (UNDER)

Subject stands. Her arms are raised and the tape is placed across the back at the level of the nipples, but is brought across the front below the fullness of the breasts. Record the measurement at the maximum dimension during normal breathing.



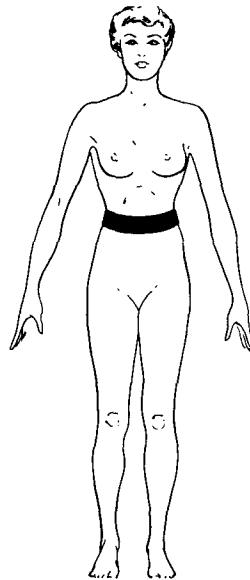
### STRAP LENGTH

Subject stands erect. The tape is placed across the back of her neck and the strap length is measured from nipple to nipple.



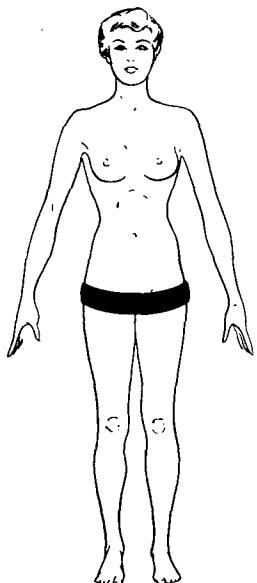
#### INTERNIPPLE

Subject stands. The distance is measured with a tape in a straight line from right to left nipple.



#### WAIST CIRCUMFERENCE

Subject stands. Measure the natural waistline with the abdomen relaxed (minimum circumference) using the tape.

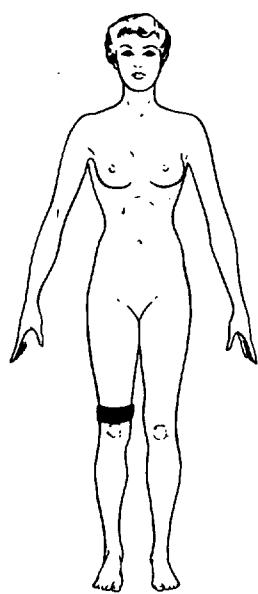
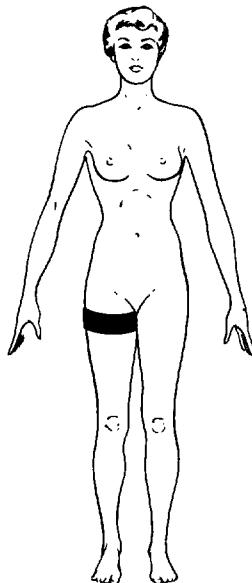


#### BUTTOCKS CIRCUMFERENCE

Subject stands. Hold the tape in a horizontal plane, passing over the area of the most posterior projection of the buttocks.

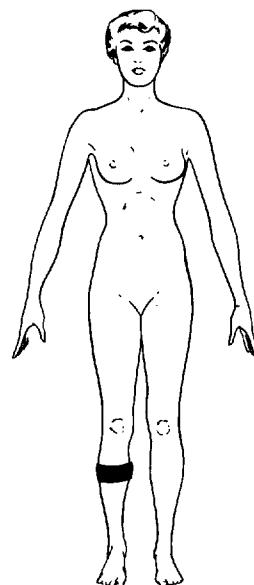
#### THIGH CIRCUMFERENCE

Subject stands, with the legs slightly apart. Place the tape horizontally around the right thigh, as high up as possible in the crotch, without including any portion of the buttock.



#### LOWER THIGH CIRCUMFERENCE

Subject stands. Hold the tape horizontally above the right knee (over the medial Vastus muscle, but below any portion of the lateral Vastus muscle).



#### CALF CIRCUMFERENCE

Subject stands. Pass the tape horizontally over the maximum bulge of the right calf.

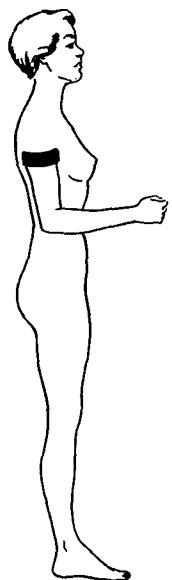
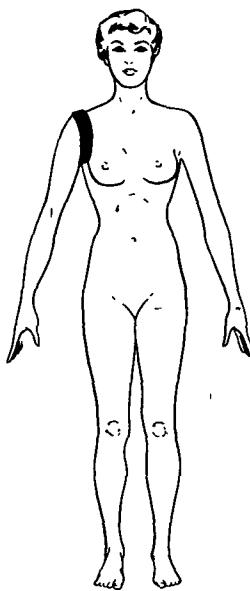


#### ANKLE CIRCUMFERENCE

Subject stands. Measure the minimum circumference with the tape held above the projections of the ankle bones of the right leg.

#### ARM SCYE

Subject stands. Place the tape through the armpit of the right arm and, with the arm lowered, measure the circumference vertically over the shoulder.

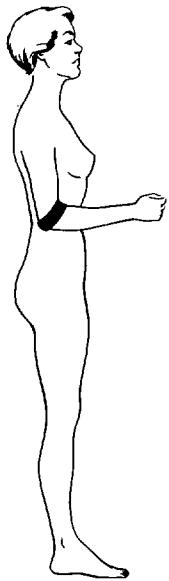
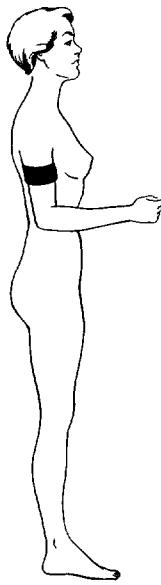


#### AXILLARY ARM CIRCUMFERENCE

Subject stands. Place the tape as high as possible in the armpit of the right arm and, with the arm at the subject's side, measure the circumference in a horizontal plane.

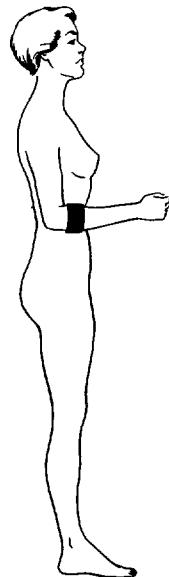
#### BICEPS CIRCUMFERENCE (FLEXED)

Ask the subject to flex her right biceps muscle and measure the circumference at the point of maximum bulge with the tape held in a plane at right angles to the long axis of the upper arm.



#### ELBOW CIRCUMFERENCE (FLEXED)

Ask the subject to flex her right arm so that her elbow is bent at a right angle. Then measure the circumference with a tape, passing over the tip and through the crotch of the elbow.



#### LOWER ARM CIRCUMFERENCE (FLEXED)

Ask the subject to hold her arm bent at a right angle and flex the muscles of the forearm by making a fist. Measure the maximum circumference of the lower arm in a plane at right angles to the long axis of the forearm.

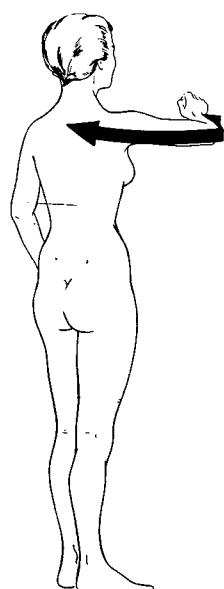
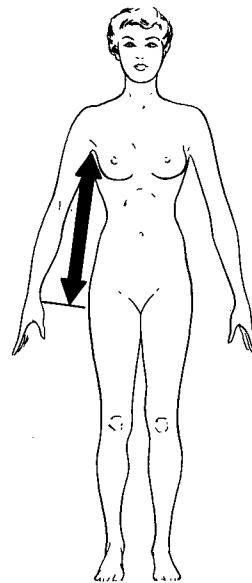


#### WRIST CIRCUMFERENCE

Measure the minimum circumference with the tape held at right angles to the long axis of the forearm just above the styloid process of the ulna.

#### SLEEVE INSEAM

The subject stands with her right arm held slightly away from her body. Measure the distance from the armpit to the distal surface of the styloid process of the radius with the special measuring stick shown in Fig. 2. (If tape is used, measure from the anterior border of the axilla).

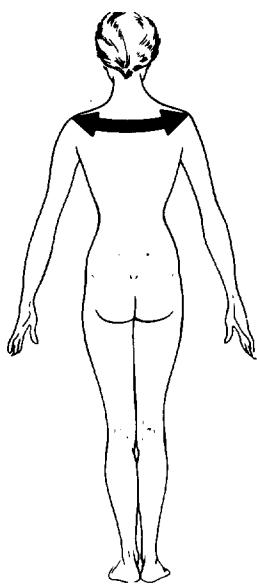
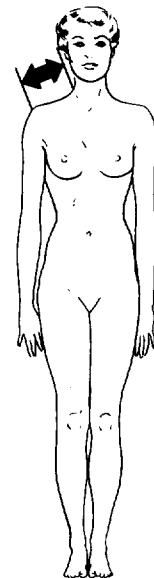


#### SLEEVE LENGTH

The subject stands with the arms raised horizontally and her elbow approximately bent at a right angle. For purposes of uniformity, both wrists may be pressed together. Measure the distance from the midpoint of the back to the distal surface of the styloid process of the ulna with the tape passing over the tip of the elbow.

#### SHOULDER LENGTH

Subject stands. Measure the surface distance from the marked point on the right side of the neck to the marked point at acromion with the tape.

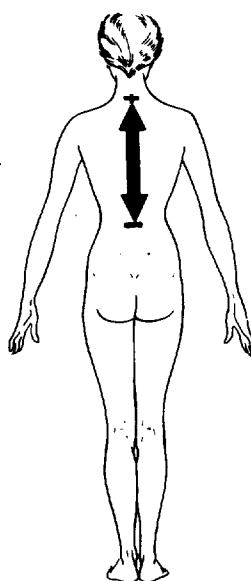


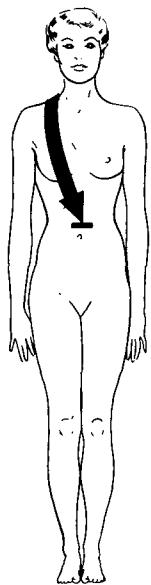
#### BIACROMIAL ARC

Subject sits erect with her upper arms hanging at her sides and her lower arms extended horizontally. Measure between the marked acromion points with the tape passing horizontally across the back.

#### WAIST BACK

Subject stands. Measure the surface distance from the marked point of cervicale to the marked point on the waist of the back with the tape.



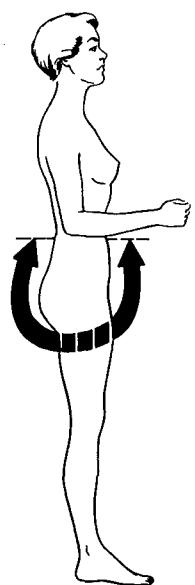
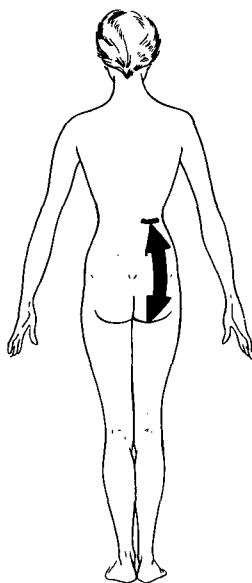


#### WAIST FRONT TO CERVICALE

Subject stands. Measure from the marked cervicale point with the tape passing over the right shoulder to the waist point marked on the abdomen.

#### GLUTEAL ARC

Subject stands. Measure the surface arc over the right buttock from the marked line on the waist to the gluteal furrow with the tape in a vertical plane.

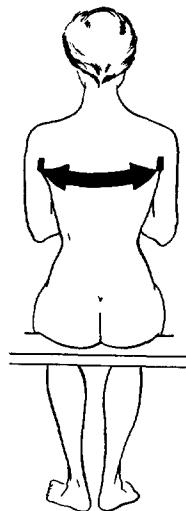
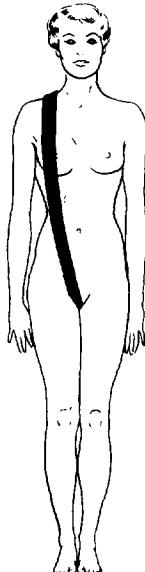


#### CROTCH LENGTH

The subject stands with her legs slightly apart. Measure the distance with the tape from the anterior waist mark through the crotch and over the right buttock to the posterior waist mark.

#### VERTICAL TRUNK CIRCUMFERENCE

Subject stands with her legs slightly apart. Measure the vertical circumference of the torso with the tape passing through the crotch and over the midpoint of the right shoulder and buttock. Before reading press the tape into the concavity of the small of the back, so that it follows the body contour at all points.

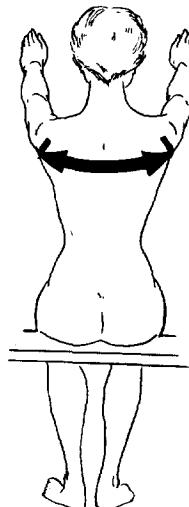


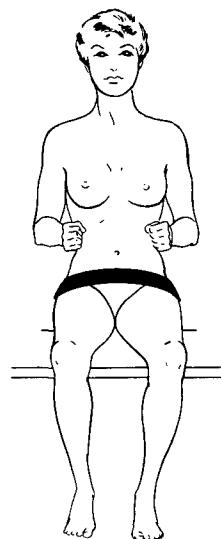
#### INTERSCYE

Subject sits erect with her hands placed on her knees. Measure the minimum surface distance between the bottoms of the marked scye points with the tape.

#### INTERSCYE MAXIMUM

Subject sits erect with her arms thrust as far forward as possible. Measure the minimum distance between the bottoms of the marked scye points with the tape across the surface of the back.



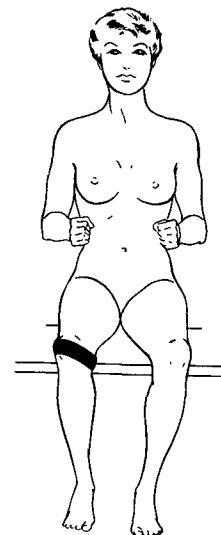


#### HIP CIRCUMFERENCE (SITTING)

Subject sits. Place the tape behind the subject and just under the buttocks at the point where they contact the seating surface. The tape is then brought up at a forty-five degree angle and across the lap in the furrow between the torso and the legs.

#### KNEE CIRCUMFERENCE (SITTING)

The subject sits with her knees bent at a right angle. Pass the tape under the popliteal area of the right leg and bring it up at about a forty-five degree angle over the knee.

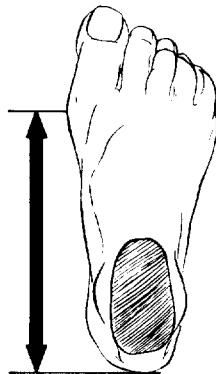


#### FOOT LENGTH

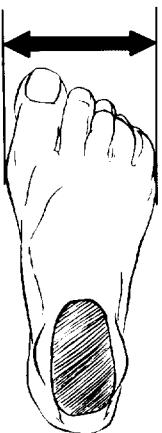
The subject stands with her weight equally distributed on both feet. Her right foot is placed in a special foot measuring box with her heel touching the rear wall of the box and the lateral edge of her instep touching the lateral wall of the box. The longitudinal axis of the foot is parallel to the lateral wall of the box so that the side of the heel is not necessarily in contact with the lateral wall of the box. Measure the length from the rear of the measuring box to the tip of the longest toe.

### INSTEP LENGTH

The subject stands with her weight equally distributed on both feet. Her right foot is placed in a special foot measuring box with her heel touching the rear wall of the box and the lateral edge of her instep touching the lateral wall of the box. The longitudinal axis of the foot is parallel to the lateral wall of the box so that the side of the heel is not necessarily in contact with the lateral wall of the box. Measure the length from the rear of the measuring box to the point of greatest width of the foot.



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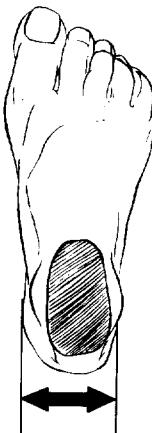


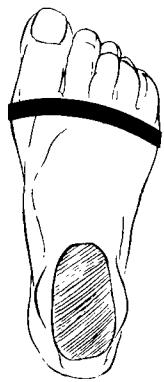
### FOOT WIDTH

The subject stands with her weight equally distributed on both feet. Her right foot is placed in a special foot measuring box with her heel touching the rear wall of the box and the lateral edge of her instep touching the lateral wall of the box. The longitudinal axis of the foot is parallel to the lateral wall of the box so that the side of the heel is not necessarily in contact with the lateral wall of the box. Locate the widest part of the foot with a block and read the width from the grid on the base of the measuring box.

### HEEL WIDTH

The subject stands with her weight equally distributed on both feet. From behind, and with the bar of the sliding caliper at right angles to the longitudinal axis of the foot, measure the maximum width of the heel behind the projection of the ankle bones.



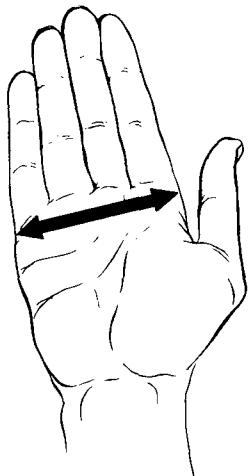
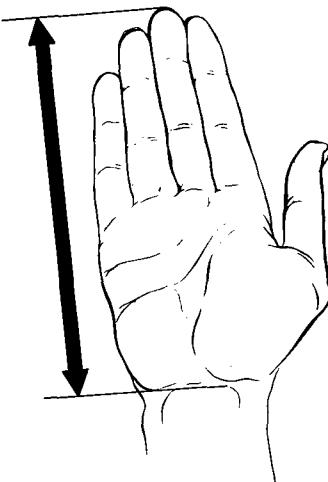


#### BALL OF FOOT CIRCUMFERENCE

Subject stands. Ask the subject to lift her right foot and place the tape under the ball of the foot. The subject then replaces her weight equally on both feet and the circumference is measured around the distal ends of the protuberances of the metatarsal bones.

#### HAND LENGTH

The subject's right hand is extended. With the sliding calipers resting on the subject's palm, measure from the proximal edge of the navicular bone to the tip of the middle finger.

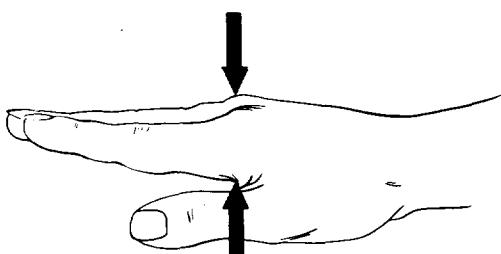
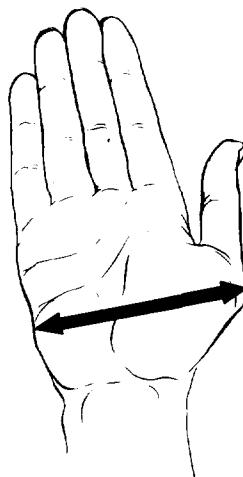


#### HAND BREADTH AT METACARPALE

The subject's hand is extended with the palm up. Place the bar of the sliding caliper across the distal ends of the metacarpal bones and measure the width with light contact.

#### HAND BREADTH AT THUMB

The subject's hand is extended, palm up. With the bar of the sliding caliper resting on the palm, measure the maximum width with light contact at right angles to the longitudinal axis of the hand. The fixed arm of the caliper is placed at the metacarpal-phalangeal joint of the thumb.

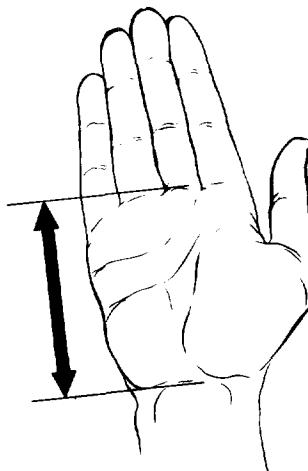


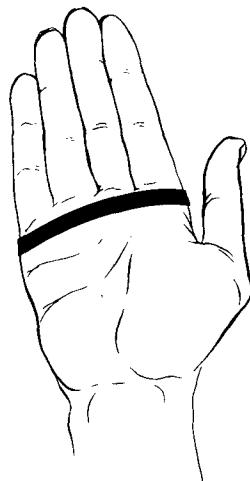
#### THICKNESS AT METACARPALE III

The subject's right hand is extended, palm up. Measure the thickness of the hand at the metacarpal-first phalanx joint of the middle finger with the sliding caliper.

#### PALM LENGTH

The subject's right hand is extended, palm up. With the bar of the sliding caliper resting on the palm, measure from the proximal edge of the navicular bone to the skin furrow formed where the middle finger folds upon the palm.



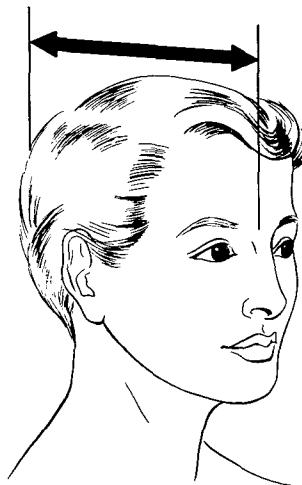
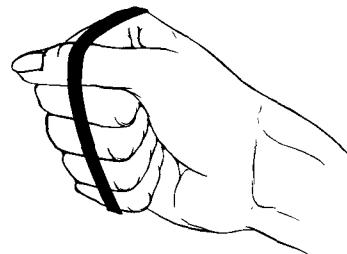


#### PALM CIRCUMFERENCE

The subject holds her right hand palm upward and with the tape measure the circumference around the distal ends of the metacarpal bones.

#### FIST CIRCUMFERENCE

The subject holds her right fist with the thumb lying on the outside. Measure the circumference with the tape passing over the distal ends of the metacarpal bones.



#### HEAD LENGTH

With the spreading caliper, measure the maximum length of the head from glabella to the occipital region of the head in the saggittal plane.

#### HEAD BREADTH

Measure the maximum breadth of the head with the spreading caliper perpendicular to the mid-sagittal plane of the head.



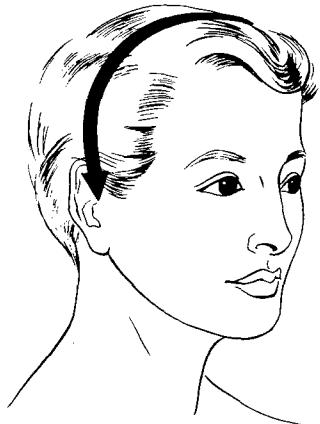
#### HEAD CIRCUMFERENCE

Subject sits. Measure the maximum circumference of the head with the tape passing over the brow ridges and held perpendicular to the mid-sagittal plane, but not necessarily horizontally.

#### SAGITTAL ARC

Subject sits. Measure the arc with the tape in the mid-sagittal plane from glabella to the lowest point on the base of the skull that can be felt by a firm touch amid the nuchal musculature. This may be at inion or below.





#### CORONAL ARC

The subject sits looking straight ahead (the head in the Frankfort plane). Measure the arc from right to left tragion over the top of the skull with the tape in a vertical plane.

#### POSTERIOR ARC

Subject sits. Measure the arc from right to left tragion with the tape passing over the lowest point of the skull where the nuchal musculature attaches.



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STATISTICAL DATA

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The statistics reported for each measurement are the mean, the standard deviation, the coefficient of variation (designated by V), the standard errors of these statistics, the range, and selected percentiles from the first to the ninety-ninth. The statistics are, in general, reported both in metric and English values.

The MEAN is the most common of the averages. It is computed by adding together each of the recorded values of the given measurement and dividing by the number of values. The mean of the weights, for example, is the sum of all 852 weights divided by 852, or:  $105,026 \text{ pounds} \div 852 = 123.27 \text{ pounds}$ .

The RANGE is reported here by specifying the smallest and largest values recorded for the measurement. It should be noted that whereas the mean is an approximation to the most common or central value for a measurement, the two figures given for the range represent the two extreme and most uncommon values and may be considerably influenced by a single unusual individual.

The STANDARD DEVIATION is a measure of the variability of the measured values. If most of the WAF's were similar in one measurement, the standard deviation of that measurement is small. If, on the other hand, in some other measurement many of the women were considerably above average and many others were considerably below average, the standard deviation of this measurement was large. As a general rule, about two-thirds of the group is within one standard deviation of the mean and about 95% are within two standard deviations of the mean. Three standard deviations either side of the mean include better than 99% of the group, and are a better approximation of the extreme values to be expected for any measurement than the actual range as recorded.

The COEFFICIENT OF VARIATION (V) is simply the standard deviation expressed as a percent of the mean value.

The STANDARD ERRORS of the mean, and other statistics, follow each of the statistics to which they apply, separated from them by  $\pm$  signs. These standard errors provide a measure of the extent to which these statistics are likely to deviate from the true mean, etc., of a hypothetical infinite WAF population of which these 852 women constitute a random sample.

The PERCENTILES are the values below which specified percents of the measured values lie. Thus, 1% of the women weighed less than the first percentile of the weights, 35% were less than the thirty-fifth, etc.

The percentiles reported here were obtained graphically from plots on special "normal distribution" graph paper.

STANDARD ERRORS OF PERCENTILES are not given directly but can be estimated from the standard errors of the mean and the following table.

<u>Percentiles</u>	<u>Standard Errors</u>					
30th thru 70th	1.3 times standard error of mean					
20th, 25th, 75th 80th	1.4	"	"	"	"	"
15th, 85th	1.5	"	"	"	"	"
10th, 90th	1.7	"	"	"	"	"
5th, 95th	2.1	"	"	"	"	"
3rd, 97th	2.5	"	"	"	"	"
2nd, 98th	2.9	"	"	"	"	"
1st, 99th	3.7	"	"	"	"	"

The statistical data on the sixty-three measurements recorded on the WAF's are as follows:

WEIGHT

Range: 84 to 173 lb.

N = 851

Mean: 123.27 ± .50 lb.

Standard Deviation: 14.54 ± .35 lb.

Coefficient of Variation: 11.80 ± .29 %

Percentile Values

1%	95.0 lb.	55%	124.5 lb.
2%	98.0 lb.	60%	126.8 lb.
3%	99.8 lb.	65%	128.8 lb.
5%	102.0 lb.	70%	131.1 lb.
10%	105.8 lb.	75%	133.0 lb.
15%	108.4 lb.	80%	134.8 lb.
20%	110.5 lb.	85%	138.0 lb.
25%	112.5 lb.	90%	142.0 lb.
30%	114.5 lb.	95%	148.2 lb.
35%	116.2 lb.	97%	153.0 lb.
40%	118.2 lb.	98%	156.5 lb.
45%	120.1 lb.	99%	162.1 lb.
50%	122.2 lb.		

STATURE

Range: 149 to 179 cm.  
58.7 to 70.5 in.

N = 851

Mean:  $162.74 \pm .20$  cm.;  $64.07 \pm .08$  in.

Standard Deviation:  $5.94 \pm .14$  cm.;  $2.34 \pm .06$  in.

Coefficient of Variation:  $3.65 \pm .09$  %

Percentile Values

1%	150.6 cm.	59.3 in.	55%	163.2 cm.	64.3 in.
2%	151.5 cm.	59.7 in.	60%	164.0 cm.	64.6 in.
3%	152.1 cm.	59.9 in.	65%	165.0 cm.	65.0 in.
5%	153.2 cm.	60.3 in.	70%	165.8 cm.	65.3 in.
10%	155.0 cm.	61.0 in.	75%	166.8 cm.	65.7 in.
15%	156.3 cm.	61.6 in.	80%	167.8 cm.	66.1 in.
20%	157.4 cm.	62.0 in.	85%	169.0 cm.	66.6 in.
25%	158.3 cm.	62.3 in.	90%	170.7 cm.	67.2 in.
30%	159.2 cm.	62.7 in.	95%	173.3 cm.	68.2 in.
35%	160.0 cm.	63.0 in.	97%	174.8 cm.	68.8 in.
40%	160.8 cm.	63.3 in.	98%	175.8 cm.	69.2 in.
45%	161.6 cm.	63.6 in.	99%	177.5 cm.	69.9 in.
50%	162.4 cm.	64.0 in.			

CERVICALE HEIGHT

Range: 122 to 159 cm.  
48.0 to 62.6 in.

N = 852

Mean: 138.18 ± .20 cm.; 54.40 ± .08 in.

Standard Deviation: 5.92 ± .14 cm.; 2.33 ± .06 in.

Coefficient of Variation: 4.29 ± .10 %

Percentile Values

1%	125.7 cm.	49.5 in.	55%	138.3 cm.	54.4 in.
2%	127.1 cm.	50.0 in.	60%	139.1 cm.	54.8 in.
3%	128.0 cm.	50.4 in.	65%	139.9 cm.	55.1 in.
5%	129.2 cm.	50.9 in.	70%	140.9 cm.	55.5 in.
10%	131.0 cm.	51.6 in.	75%	142.0 cm.	55.9 in.
15%	132.1 cm.	52.0 in.	80%	143.1 cm	56.3 in.
20%	133.1 cm.	52.4 in.	85%	144.2 cm.	56.8 in.
25%	134.0 cm.	52.7 in.	90%	145.8 cm.	57.4 in.
30%	134.7 cm.	53.0 in.	95%	147.9 cm.	58.2 in.
35%	135.4 cm.	53.3 in.	97%	149.5 cm.	58.8 in.
40%	136.2 cm.	53.6 in.	98%	150.8 cm.	59.4 in.
45%	136.9 cm.	53.9 in.	99%	153.3 cm.	60.3 in.
50%	137.6 cm.	54.2 in.			

ACROMIAL HEIGHT

Range: 117 to 149 cm.  
46.1 to 58.7 in.

N = 849

Mean: 131.48 ± .19 cm.; 51.76 ± .07 in.

Standard Deviation: 5.53 ± .14 cm.; 2.18 ± .05 in.

Coefficient of Variation: 4.21 ± .10 %

Percentile Values

1%	119.1 cm.	46.9 in.	55%	132.4 cm.	52.1 in.
2%	120.4 cm.	47.4 in.	60%	133.0 cm.	52.4 in.
3%	121.2 cm.	47.7 in.	65%	133.8 cm.	52.7 in.
5%	122.4 cm.	48.2 in.	70%	134.5 cm.	53.0 in.
10%	124.4 cm.	49.0 in.	75%	135.3 cm.	53.3 in.
15%	125.8 cm.	49.5 in.	80%	136.2 cm.	53.6 in.
20%	126.9 cm.	50.0 in.	85%	137.0 cm.	53.9 in.
25%	127.8 cm.	50.3 in.	90%	138.3 cm.	54.5 in.
30%	128.8 cm.	50.7 in.	95%	140.8 cm.	55.4 in.
35%	129.6 cm.	51.0 in.	97%	142.4 cm.	56.1 in.
40%	130.3 cm.	51.3 in.	98%	143.6 cm.	56.5 in.
45%	131.0 cm.	51.6 in.	99%	145.5 cm.	57.3 in.
50%	131.7 cm.	51.9 in.			

AXILLA HEIGHT

Range: 109 to 142 cm.  
42.9 to 55.9 in.

N = 851

Mean: 123.81 ± .19 cm.; 48.74 ± .08 in.

Standard Deviation: 5.65 ± .14 cm.; 2.22 ± .05 in.

Coefficient of Variation: 4.56 ± .11 %

Percentile Values

1%	112.0 cm.	44.1 in.	55%	124.7 cm.	49.1 in.
2%	113.0 cm.	44.5 in.	60%	125.5 cm.	49.4 in.
3%	113.7 cm.	44.8 in.	65%	126.4 cm.	49.8 in.
5%	114.7 cm.	45.2 in.	70%	127.2 cm.	50.1 in.
10%	116.4 cm.	45.8 in.	75%	128.1 cm.	50.4 in.
15%	117.8 cm.	46.4 in.	80%	129.1 cm.	50.8 in.
20%	119.0 cm.	46.9 in.	85%	130.2 cm.	51.3 in.
25%	120.0 cm.	47.2 in.	90%	131.6 cm.	51.8 in.
30%	120.8 cm.	47.6 in.	95%	133.6 cm.	52.6 in.
35%	121.6 cm.	47.9 in.	97%	134.8 cm.	53.1 in.
40%	122.4 cm.	48.2 in.	98%	135.8 cm.	53.4 in.
45%	123.2 cm.	48.5 in.	99%	137.1 cm.	54.0 in.
50%	123.9 cm.	48.8 in.			

GLUTEAL FURROW HEIGHT

Range: 63 to 89 cm.  
24.8 to 35.0 in.

N = 848

Mean:  $74.29 \pm .14$  cm.;  $29.25 \pm .05$  in.

Standard Deviation:  $4.00 \pm .10$  cm.;  $1.58 \pm .04$  in.

Coefficient of Variation:  $5.39 \pm .13$  %

Percentile Values

1%	65.8 cm.	25.9 in.	55%	74.5 cm.	29.3 in.
2%	66.8 cm.	26.3 in.	60%	75.0 cm.	29.5 in.
3%	67.4 cm.	26.6 in.	65%	75.5 cm.	29.7 in.
5%	68.2 cm.	26.9 in.	70%	76.0 cm.	29.9 in.
10%	69.5 cm.	27.4 in.	75%	76.6 cm.	30.2 in.
15%	70.4 cm.	27.7 in.	80%	77.4 cm.	30.5 in.
20%	71.0 cm.	28.0 in.	85%	78.2 cm.	30.8 in.
25%	71.6 cm.	28.2 in.	90%	79.4 cm.	31.3 in.
30%	72.1 cm.	28.4 in.	95%	81.0 cm.	31.9 in.
35%	72.6 cm.	28.6 in.	97%	82.2 cm.	32.4 in.
40%	73.1 cm.	28.8 in.	98%	83.1 cm.	32.7 in.
45%	73.6 cm.	29.0 in.	99%	85.0 cm.	33.5 in.
50%	74.0 cm.	29.1 in.			

WAIST HEIGHT

Range: 86 to 116 cm.  
33.9 to 45.7 in.

N = 848

Mean:  $100.80 \pm .16$  cm.;  $39.68 \pm .06$  in.

Standard Deviation:  $4.71 \pm .11$  cm.;  $1.85 \pm .04$  in.

Coefficient of Variation:  $4.67 \pm .11$  %

Percentile Values

1%	90.8 cm.	35.8 in.	55%	101.6 cm.	40.0 in.
2%	91.8 cm.	36.1 in.	60%	102.2 cm.	40.2 in.
3%	92.6 cm.	36.5 in.	65%	102.8 cm.	40.5 in.
5%	93.5 cm.	36.8 in.	70%	103.6 cm.	40.8 in.
10%	95.0 cm.	37.4 in.	75%	104.2 cm.	41.0 in.
15%	96.0 cm.	37.8 in.	80%	105.0 cm.	41.3 in.
20%	97.0 cm.	38.2 in.	85%	105.8 cm.	41.7 in.
25%	97.7 cm.	38.5 in.	90%	106.9 cm.	42.1 in.
30%	98.4 cm.	38.7 in.	95%	108.5 cm.	42.7 in.
35%	99.1 cm.	39.0 in.	97%	109.6 cm.	43.1 in.
40%	99.7 cm.	39.3 in.	98%	110.6 cm.	43.5 in.
45%	100.4 cm.	39.5 in.	99%	112.0 cm.	44.1 in.
50%	101.0 cm.	39.8 in.			

CROTCH HEIGHT

Range: 66 to 91 cm.  
26.0 to 35.8 in.

N = 851

Mean:  $76.99 \pm .14$  cm.;  $30.31 \pm .06$  in.

Standard Deviation:  $4.15 \pm .10$  cm.;  $1.63 \pm .04$  in.

Coefficient of Variation:  $5.39 \pm .13$  %

Percentile Values

1%	69.2 cm.	27.3 in.	55%	77.3 cm.	30.4 in.
2%	69.9 cm.	27.5 in.	60%	77.8 cm.	30.6 in.
3%	70.4 cm.	27.7 in.	65%	78.4 cm.	30.9 in.
5%	71.1 cm.	28.0 in.	70%	79.1 cm.	31.2 in.
10%	72.2 cm.	28.4 in.	75%	79.8 cm.	31.4 in.
15%	73.0 cm.	28.8 in.	80%	80.5 cm.	31.7 in.
20%	73.6 cm.	29.0 in.	85%	81.4 cm.	32.1 in.
25%	74.2 cm.	29.2 in.	90%	82.2 cm.	32.4 in.
30%	74.6 cm.	29.4 in.	95%	84.0 cm.	33.1 in.
35%	75.2 cm.	29.6 in.	97%	85.0 cm.	33.5 in.
40%	75.7 cm.	29.8 in.	98%	85.6 cm.	33.7 in.
45%	76.2 cm.	30.0 in.	99%	87.2 cm.	34.3 in.
50%	76.8 cm.	30.2 in.			

PATELLA HEIGHT

Range: 32 to 62 cm.  
12.6 to 24.4 in.

N = 847

Mean:  $48.76 \pm .12$  cm.;  $19.20 \pm .05$  in.

Standard Deviation:  $3.43 \pm .08$  cm.;  $1.35 \pm .03$  in.

Coefficient of Variation:  $7.03 \pm .17$  %

Percentile Values

1%	38.6 cm.	15.2 in.	55%	49.4 cm.	19.5 in.
2%	40.6 cm.	16.0 in.	60%	49.8 cm.	19.6 in.
3%	41.7 cm.	16.4 in.	65%	50.2 cm.	19.8 in.
5%	43.0 cm.	16.9 in.	70%	50.6 cm.	19.9 in.
10%	44.8 cm.	17.6 in.	75%	51.0 cm.	20.1 in.
15%	45.8 cm.	18.0 in.	80%	51.5 cm.	20.3 in.
20%	46.5 cm.	18.3 in.	85%	52.1 cm.	20.5 in.
25%	47.0 cm.	18.5 in.	90%	52.8 cm.	20.8 in.
30%	47.4 cm.	18.7 in.	95%	54.2 cm.	21.3 in.
35%	47.8 cm.	18.8 in.	97%	55.1 cm.	21.7 in.
40%	48.2 cm.	19.0 in.	98%	55.8 cm.	22.0 in.
45%	48.6 cm.	19.1 in.	99%	57.2 cm.	22.5 in.
50%	49.0 cm.	19.3 in.			

CALF HEIGHT

Range: 26 to 49 cm.  
10.2 to 19.3 in.

N = 851

Mean:  $33.09 \pm .09$  cm.;  $13.03 \pm .04$  in.

Standard Deviation:  $2.71 \pm .07$  cm.;  $1.07 \pm .03$  in.

Coefficient of Variation:  $8.19 \pm .20$  %

Percentile Values

1%	27.4 cm.	10.8 in.	55%	33.3 cm.	13.1 in.
2%	28.0 cm.	11.0 in.	60%	33.6 cm.	13.2 in.
3%	28.5 cm.	11.2 in.	65%	33.9 cm.	13.4 in.
5%	29.3 cm.	11.5 in.	70%	34.2 cm.	13.5 in.
10%	30.0 cm.	11.8 in.	75%	34.6 cm.	13.6 in.
15%	30.6 cm.	12.0 in.	80%	35.0 cm.	13.8 in.
20%	31.1 cm.	12.2 in.	85%	35.4 cm.	14.0 in.
25%	31.5 cm.	12.4 in.	90%	36.1 cm.	14.2 in.
30%	31.8 cm.	12.5 in.	95%	37.1 cm.	14.6 in.
35%	32.2 cm.	12.7 in.	97%	38.0 cm.	15.0 in.
40%	32.5 cm.	12.8 in.	98%	38.9 cm.	15.3 in.
45%	32.8 cm.	12.9 in.	99%	42.9 cm.	16.9 in.
50%	33.1 cm.	13.0 in.			

ANKLE HEIGHT

Range: 45 to 72 mm.  
1.8 to 2.8 in.

N = 845

Mean:  $60.27 \pm .14$  mm.;  $2.37 \pm .01$  in.

Standard Deviation:  $3.93 \pm .10$  mm.;  $.15 \pm .00$  in.

Coefficient of Variation:  $6.52 \pm .16$  %

Percentile Values

1%	50.4 mm.	1.98 in.	55%	61.3 mm.	2.41 in.
2%	51.7 mm.	2.04 in.	60%	61.8 mm.	2.43 in.
3%	52.6 mm.	2.07 in.	65%	62.2 mm.	2.45 in.
5%	53.7 mm.	2.11 in.	70%	62.7 mm.	2.47 in.
10%	55.4 mm.	2.18 in.	75%	63.1 mm.	2.48 in.
15%	56.5 mm.	2.22 in.	80%	63.7 mm.	2.51 in.
20%	57.4 mm.	2.26 in.	85%	64.1 mm.	2.52 in.
25%	58.1 mm.	2.29 in.	90%	65.0 mm.	2.56 in.
30%	58.8 mm.	2.32 in.	95%	66.2 mm.	2.61 in.
35%	59.4 mm.	2.34 in.	97%	68.4 mm.	2.69 in.
40%	59.9 mm.	2.36 in.	98%	69.4 mm.	2.73 in.
45%	60.4 mm.	2.38 in.	99%	71.0 mm.	2.80 in.
50%	60.9 mm.	2.40 in.			

CHEST BREADTH

Range: 21 to 31 cm.  
8.3 to 12.2 in.

N = 834

Mean:  $25.25 \pm .05$  cm.;  $9.94 \pm .02$  in.

Standard Deviation:  $1.40 = .03$  cm.;  $.55 \pm .01$  in.

Coefficient of Variation:  $5.55 \pm .14$  %

Percentile Values

1%	22.5 cm.	8.9 in.	55%	25.3 cm.	10.0 in.
2%	22.7 cm.	8.9 in.	60%	25.5 cm.	10.0 in.
3%	22.8 cm.	9.0 in.	65%	25.6 cm.	10.1 in.
5%	23.1 cm.	9.1 in.	70%	25.8 cm.	10.2 in.
10%	23.4 cm.	9.2 in.	75%	26.1 cm.	10.3 in.
15%	23.7 cm.	9.3 in.	80%	26.4 cm.	10.4 in.
20%	23.9 cm.	9.4 in.	85%	26.7 cm.	10.5 in.
25%	24.1 cm.	9.5 in.	90%	27.2 cm.	10.6 in.
30%	24.3 cm.	9.6 in.	95%	27.6 cm.	10.9 in.
35%	24.5 cm.	9.7 in.	97%	28.0 cm.	11.0 in.
40%	24.7 cm.	9.7 in.	98%	28.3 cm.	11.1 in.
45%	24.9 cm.	9.8 in.	99%	28.7 cm.	11.3 in.
50%	25.1 cm.	9.9 in.			

HIP BREADTH

Range: 25 to 47 cm.  
9.8 to 10.5 in.

N = 850

Mean:  $35.05 \pm .08$  cm.;  $13.80 \pm .03$  in.

Standard Deviation:  $2.41 \pm .06$  cm.;  $.95 \pm .02$  in.

Coefficient of Variation:  $6.88 \pm .17$  %

Percentile Values

1%	31.0 cm.	12.2 in.	55%	34.7 cm.	13.7 in.
2%	31.4 cm.	12.3 in.	60%	35.0 cm.	13.8 in.
3%	31.6 cm.	12.4 in.	65%	35.3 cm.	13.9 in.
5%	31.8 cm.	12.5 in.	70%	35.6 cm.	14.0 in.
10%	32.2 cm.	12.7 in.	75%	36.0 cm.	14.2 in.
15%	32.5 cm.	12.8 in.	80%	36.5 cm.	14.4 in.
20%	32.8 cm.	12.9 in.	85%	37.2 cm.	14.6 in.
25%	33.1 cm.	13.0 in.	90%	37.8 cm.	14.9 in.
30%	33.4 cm.	13.1 in.	95%	39.2 cm.	15.4 in.
35%	33.6 cm.	13.2 in.	97%	40.2 cm.	15.8 in.
40%	33.8 cm.	13.3 in.	98%	41.0 cm.	16.1 in.
45%	34.2 cm.	13.4 in.	99%	42.9 cm.	16.9 in.
50%	34.4 cm.	13.5 in.			

NECK CIRCUMFERENCE

Range: 28 to 41 cm.  
11.0 to 16.1 in.

N = 846

Mean:  $32.73 \pm .06$  cm.;  $12.99 \pm .02$  in.

Standard Deviation:  $1.66 \pm .04$  cm.;  $.65 \pm .02$  in.

Coefficient of Variation:  $5.07 \pm .12$  %

Percentile Values

1%	29.4 cm.	11.6 in.	55%	32.8 cm.	12.9 in.
2%	29.7 cm.	11.7 in.	60%	33.0 cm.	13.0 in.
3%	30.0 cm.	11.8 in.	65%	33.3 cm.	13.1 in.
5%	30.3 cm.	11.9 in.	70%	33.5 cm.	13.2 in.
10%	30.7 cm.	12.1 in.	75%	33.7 cm.	13.3 in.
15%	31.1 cm.	12.2 in.	80%	34.0 cm.	13.4 in.
20%	31.3 cm.	12.3 in.	85%	34.4 cm.	13.5 in.
25%	31.6 cm.	12.4 in.	90%	34.9 cm.	13.7 in.
30%	31.8 cm.	12.5 in.	95%	35.7 cm.	14.1 in.
35%	32.0 cm.	12.6 in.	97%	36.3 cm.	14.3 in.
40%	32.2 cm.	12.7 in.	98%	36.7 cm.	14.5 in.
45%	32.4 cm.	12.8 in.	99%	37.5 cm.	14.8 in.
50%	32.6 cm.	12.8 in.			

SHOULDER CIRCUMFERENCE

Range: 84 to 109 cm.  
33.1 to 42.9 in.

N = 851

Mean: 96.01 ± .14 cm.; 37.80 ± .06 in.

Standard Deviation: 4.21 ± .10 cm.; 1.66 ± .04 in.

Coefficient of Variation: 4.39 ± .11%

Percentile Values

1%	86.8 cm.	34.2 in.	55%	96.6 cm.	38.0 in.
2%	87.8 cm.	34.6 in.	60%	97.0 cm.	38.2 in.
3%	88.5 cm.	34.9 in.	65%	97.5 cm.	38.4 in.
5%	89.4 cm.	35.2 in.	70%	98.2 cm.	38.7 in.
10%	90.8 cm.	35.8 in.	75%	98.8 cm.	38.9 in.
15%	91.8 cm.	36.1 in.	80%	99.6 cm.	39.2 in.
20%	92.6 cm.	36.5 in.	85%	100.4 cm.	39.5 in.
25%	93.2 cm.	36.7 in.	90%	101.5 cm.	39.9 in.
30%	93.8 cm.	37.0 in.	95%	103.1 cm.	40.6 in.
35%	94.4 cm.	37.2 in.	97%	104.2 cm.	41.0 in.
40%	95.0 cm.	37.4 in.	98%	105.0 cm.	41.4 in.
45%	95.4 cm.	37.6 in.	99%	106.4 cm.	41.9 in.
50%	96.0 cm.	37.8 in.			

CHEST CIRCUMFERENCE (OVER)

Range: 68 to 97 cm.  
26.8 to 38.2 in.

N = 852

Mean:  $82.16 \pm .14$  cm.;  $32.35 \pm .06$  in.

Standard Deviation:  $4.23 \pm .10$  cm.;  $1.66 \pm .04$  in.

Coefficient of Variation:  $5.14 \pm .12$  %

Percentile Values

1%	72.8 cm.	28.6 in.	55%	82.7 cm.	32.6 in.
2%	74.0 cm.	29.1 in.	60%	83.2 cm.	32.8 in.
3%	74.8 cm.	29.4 in.	65%	83.7 cm.	33.0 in.
5%	75.7 cm.	29.8 in.	70%	84.3 cm.	33.2 in.
10%	77.2 cm.	30.4 in.	75%	84.9 cm.	33.4 in.
15%	78.2 cm.	30.8 in.	80%	85.6 cm.	33.7 in.
20%	78.9 cm.	31.1 in.	85%	86.5 cm.	34.0 in.
25%	79.5 cm.	31.3 in.	90%	87.6 cm.	34.5 in.
30%	80.1 cm.	31.6 in.	95%	89.5 cm.	35.2 in.
35%	80.7 cm.	31.8 in.	97%	90.6 cm.	35.6 in.
40%	81.2 cm.	32.0 in.	98%	91.4 cm.	36.0 in.
45%	81.7 cm.	32.2 in.	99%	92.8 cm.	36.5 in.
50%	82.2 cm.	32.4 in.			

BUST CIRCUMFERENCE

Range: 68 to 104 cm.  
26.8 to 40.9 in.

N = 851

Mean: 85.59 ± .18 cm.; 33.70 ± .07 in.

Standard Deviation: 5.15 ± .12 cm.; 2.02 ± .05 in.

Coefficient of Variation: 6.01 ± .15 %

Percentile Values

1%	73.8 cm.	29.1 in.	55%	86.0 cm.	33.9 in.
2%	75.4 cm.	29.7 in.	60%	86.6 cm.	34.1 in.
3%	76.3 cm.	30.0 in.	65%	87.2 cm.	34.3 in.
5%	77.5 cm.	30.5 in.	70%	88.0 cm.	34.7 in.
10%	79.4 cm.	31.3 in.	75%	88.8 cm.	35.0 in.
15%	80.5 cm.	31.7 in.	80%	89.7 cm.	35.3 in.
20%	81.4 cm.	32.1 in.	85%	90.8 cm.	35.8 in.
25%	82.4 cm.	32.4 in.	90%	92.0 cm.	36.2 in.
30%	82.9 cm.	32.6 in.	95%	93.9 cm.	37.0 in.
35%	83.6 cm.	32.9 in.	97%	95.2 cm.	37.5 in.
40%	84.2 cm.	33.2 in.	98%	96.2 cm.	37.9 in.
45%	84.8 cm.	33.4 in.	99%	97.9 cm.	38.6 in.
50%	85.4 cm.	33.6 in.			

CHEST CIRCUMFERENCE (UNDER)

Range: 61 to 92 cm.  
24.0 to 36.2 in.

N = 850

Mean:  $75.11 \pm .16$  cm.;  $29.57 \pm .06$  in.

Standard Deviation:  $4.69 \pm .11$  cm.;  $1.85 \pm .04$  in.

Coefficient of Variation:  $6.24 \pm .15$  %

Percentile Values

1%	64.7 cm.	25.5 in.	55%	75.0 cm.	29.5 in.
2%	65.8 cm.	25.9 in.	60%	75.6 cm.	29.8 in.
3%	66.6 cm.	26.2 in.	65%	76.2 cm.	30.0 in.
5%	67.5 cm.	26.6 in.	70%	76.9 cm.	30.3 in.
10%	69.0 cm.	27.2 in.	75%	77.7 cm.	30.6 in.
15%	70.0 cm.	27.6 in.	80%	78.6 cm.	30.9 in.
20%	70.8 cm.	27.9 in.	85%	79.6 cm.	31.3 in.
25%	71.5 cm.	28.2 in.	90%	81.0 cm.	31.9 in.
30%	72.2 cm.	28.4 in.	95%	83.3 cm.	32.8 in.
35%	72.7 cm.	28.6 in.	97%	84.8 cm.	33.4 in.
40%	73.3 cm.	28.9 in.	98%	85.8 cm.	33.8 in.
45%	73.9 cm.	29.1 in.	99%	87.8 cm.	34.6 in.
50%	74.5 cm.	29.3 in.			

STRAP LENGTH

Range: 50 to 81 cm.  
19.7 to 31.9 in.

N = 851

Mean:  $62.80 \pm .13$  cm.;  $24.72 \pm .05$  in.

Standard Deviation:  $3.88 \pm .09$  cm.;  $1.53 \pm .04$  in.

Coefficient of Variation:  $6.18 \pm .15$  %

Percentile Values

1%	54.0 cm.	21.3 in.	55%	63.0 cm.	24.8 in.
2%	55.0 cm.	21.7 in.	60%	63.5 cm.	25.0 in.
3%	55.7 cm.	21.9 in.	65%	64.0 cm.	25.2 in.
5%	56.6 cm.	22.3 in.	70%	64.5 cm.	25.4 in.
10%	57.8 cm.	22.8 in.	75%	65.1 cm.	25.6 in.
15%	58.7 cm.	23.1 in.	80%	65.8 cm.	25.9 in.
20%	59.4 cm.	23.4 in.	85%	66.6 cm.	26.2 in.
25%	60.0 cm.	23.6 in.	90%	67.7 cm.	26.6 in.
30%	60.6 cm.	23.8 in.	95%	69.3 cm.	27.3 in.
35%	61.1 cm.	24.0 in.	97%	70.4 cm.	27.7 in.
40%	61.5 cm.	24.2 in.	98%	71.4 cm.	28.1 in.
45%	62.0 cm.	24.4 in.	99%	73.0 cm.	28.7 in.
50%	62.5 cm.	24.6 in.			

INTERNIPPLE DISTANCE

Range: 15 to 28 cm.  
5.9 to 11.0 in.

N = 850

Mean:  $19.37 \pm .05$  cm.;  $7.63 \pm .02$  in.

Standard Deviation:  $1.57 \pm .04$  cm.;  $.62 \pm .01$  in.

Coefficient of Variation:  $8.10 \pm .20$  %

Percentile Values

1%	16.0 cm.	6.3 in.	55%	19.4 cm.	7.6 in.
2%	16.3 cm.	6.4 in.	60%	19.6 cm.	7.7 in.
3%	16.6 cm.	6.5 in.	65%	19.8 cm.	7.8 in.
5%	16.9 cm.	6.6 in.	70%	20.1 cm.	7.9 in.
10%	17.4 cm.	6.8 in.	75%	20.3 cm.	8.0 in.
15%	17.7 cm.	7.0 in.	80%	20.6 cm.	8.1 in.
20%	18.0 cm.	7.1 in.	85%	21.0 cm.	8.3 in.
25%	18.2 cm.	7.2 in.	90%	21.4 cm.	8.4 in.
30%	18.5 cm.	7.3 in.	95%	22.1 cm.	8.7 in.
35%	18.7 cm.	7.3 in.	97%	22.6 cm.	8.9 in.
40%	18.9 cm.	7.4 in.	98%	23.0 cm.	9.0 in.
45%	19.0 cm.	7.5 in.	99%	23.5 cm.	9.3 in.
50%	19.2 cm.	7.6 in.			

WAIST CIRCUMFERENCE

Range: 52 to 86 cm.  
20.5 to 33.9 in.

N = 848

Mean:  $65.70 \pm .14$  cm.;  $25.87 \pm .06$  in.

Standard Deviation:  $4.14 \pm .10$  cm.;  $1.63 \pm .04$  in.

Coefficient of Variation:  $6.30 \pm .15$  %

Percentile Values

1%	57.5 cm.	22.7 in.	55%	66.0 cm.	26.0 in.
2%	58.3 cm.	23.0 in.	60%	66.5 cm.	26.2 in.
3%	59.0 cm.	23.2 in.	65%	67.0 cm.	26.4 in.
5%	59.8 cm.	23.6 in.	70%	67.7 cm.	26.6 in.
10%	61.0 cm.	24.0 in.	75%	68.2 cm.	26.9 in.
15%	61.8 cm.	24.3 in.	80%	69.0 cm.	27.2 in.
20%	62.5 cm.	24.6 in.	85%	69.9 cm.	27.5 in.
25%	63.0 cm.	24.8 in.	90%	71.0 cm.	28.0 in.
30%	63.5 cm.	25.0 in.	95%	72.8 cm.	28.7 in.
35%	64.1 cm.	25.2 in.	97%	74.0 cm.	29.1 in.
40%	64.6 cm.	25.4 in.	98%	74.9 cm.	29.5 in.
45%	65.0 cm.	25.6 in.	99%	76.4 cm.	30.1 in.
50%	65.5 cm.	25.8 in.			

BUTTOCKS CIRCUMFERENCE

Range: 79 to 114 cm.  
31.1 to 44.9 in.

N = 847

Mean:  $93.73 \pm .19$  cm.;  $36.90 \pm .07$  in.

Standard Deviation:  $5.40 \pm .13$  cm.;  $2.13 \pm .05$  in.

Coefficient of Variation:  $5.76 \pm .14$  %

Percentile Values

1%	81.0 cm.	31.9 in.	55%	93.9 cm.	37.0 in.
2%	84.2 cm.	33.1 in.	60%	94.5 cm.	37.2 in.
3%	84.9 cm.	33.4 in.	65%	95.2 cm.	37.5 in.
5%	85.9 cm.	33.8 in.	70%	95.9 cm.	37.7 in.
10%	87.4 cm.	34.4 in.	75%	96.7 cm.	38.1 in.
15%	88.5 cm.	34.8 in.	80%	97.6 cm.	38.4 in.
20%	89.4 cm.	35.2 in.	85%	98.7 cm.	38.8 in.
25%	90.1 cm.	35.5 in.	90%	100.3 cm.	39.5 in.
30%	90.8 cm.	35.7 in.	95%	102.4 cm.	40.3 in.
35%	91.4 cm.	36.0 in.	97%	103.8 cm.	40.9 in.
40%	92.0 cm.	36.2 in.	98%	104.8 cm.	41.3 in.
45%	92.6 cm.	36.4 in.	99%	107.0 cm.	42.1 in.
50%	93.3 cm.	36.7 in.			

THIGH CIRCUMFERENCE

Range: 44 to 71 cm.  
17.3 to 28.0 in.

N = 850

Mean: 55.58 ± .14 cm.; 21.88 ± .06 in.

Standard Deviation: 4.18 ± .10 cm.; 1.65 ± .04 in.

Coefficient of Variation: 7.52 ± .18 %

Percentile Values

1%	46.6 cm.	18.3 in.	55%	56.1 cm.	22.1 in.
2%	47.5 cm.	18.7 in.	60%	56.7 cm.	22.3 in.
3%	48.1 cm.	18.9 in.	65%	57.2 cm.	22.5 in.
5%	49.0 cm.	19.3 in.	70%	57.9 cm.	22.8 in.
10%	50.3 cm.	19.8 in.	75%	58.5 cm.	23.0 in.
15%	51.2 cm.	20.2 in.	80%	59.3 cm.	23.3 in.
20%	52.1 cm.	20.5 in.	85%	60.2 cm.	23.7 in.
25%	52.7 cm.	20.8 in.	90%	61.1 cm.	24.1 in.
30%	53.4 cm.	21.0 in.	95%	62.7 cm.	24.7 in.
35%	54.0 cm.	21.2 in.	97%	63.6 cm.	25.0 in.
40%	54.5 cm.	21.5 in.	98%	64.4 cm.	25.3 in.
45%	55.1 cm.	21.7 in.	99%	66.3 cm.	26.1 in.
50%	55.6 cm.	21.9 in.			

LOWER THIGH CIRCUMFERENCE

Range: 31 to 47 cm.  
12.2 to 18.5 in.

N = 849

Mean:  $37.57 \pm .09$  cm.;  $14.79 \pm .04$  in.

Standard Deviation:  $2.69 \pm .07$  cm.;  $1.06 \pm .03$  in.

Coefficient of Variation:  $7.15 \pm .17$  %

Percentile Values

1%	32.1 cm.	12.7 in.	55%	37.7 cm.	14.8 in.
2%	32.6 cm.	12.8 in.	60%	38.1 cm.	15.0 in.
3%	33.0 cm.	13.0 in.	65%	38.4 cm.	15.1 in.
5%	33.5 cm.	13.2 in.	70%	38.8 cm.	15.3 in.
10%	34.2 cm.	13.5 in.	75%	39.3 cm.	15.5 in.
15%	34.8 cm.	13.7 in.	80%	39.8 cm.	15.6 in.
20%	35.3 cm.	13.9 in.	85%	40.3 cm.	15.9 in.
25%	35.7 cm.	14.1 in.	90%	41.0 cm.	16.2 in.
30%	36.0 cm.	14.2 in.	95%	42.2 cm.	16.6 in.
35%	36.4 cm.	14.3 in.	97%	43.0 cm.	16.9 in.
40%	36.7 cm.	14.5 in.	98%	43.4 cm.	17.1 in.
45%	37.0 cm.	14.6 in.	99%	44.4 cm.	17.5 in.
50%	37.4 cm.	14.7 in.			

CALF CIRCUMFERENCE

Range: 27 to 42 cm.  
10.6 to 16.5 in.

N = 846

Mean:  $34.08 \pm .09$  cm.;  $13.42 \pm .03$  in.

Standard Deviation:  $2.48 \pm .06$  cm.;  $.98 \pm .02$  in.

Coefficient of Variation:  $7.29 \pm .18$  %

Percentile Values

1%	28.7 cm.	11.3 in.	55%	33.9 cm.	13.4 in.
2%	29.1 cm.	11.5 in.	60%	34.2 cm.	13.5 in.
3%	29.4 cm.	11.6 in.	65%	34.6 cm.	13.6 in.
5%	29.8 cm.	11.7 in.	70%	35.0 cm.	13.8 in.
10%	30.5 cm.	12.0 in.	75%	35.3 cm.	13.9 in.
15%	31.1 cm.	12.2 in.	80%	35.8 cm.	14.1 in.
20%	31.5 cm.	12.4 in.	85%	36.4 cm.	14.3 in.
25%	31.9 cm.	12.6 in.	90%	37.0 cm.	14.6 in.
30%	32.3 cm.	12.7 in.	95%	38.0 cm.	15.0 in.
35%	32.6 cm.	12.8 in.	97%	38.7 cm.	15.2 in.
40%	33.0 cm.	13.0 in.	98%	39.1 cm.	15.4 in.
45%	33.3 cm.	13.1 in.	99%	39.9 cm.	15.7 in.
50%	33.6 cm.	13.2 in.			

ANKLE CIRCUMFERENCE

Range: 18 to 26 cm.  
7.1 to 10.2 in.

N = 848

Mean:  $21.51 \pm .04$  cm.;  $8.47 \pm .02$  in.

Standard Deviation:  $1.23 \pm .03$  cm.;  $.48 \pm .01$  in.

Coefficient of Variation:  $5.71 \pm .14$  %

Percentile Values

1%	19.1 cm.	7.5 in.	55%	21.6 cm.	8.5 in.
2%	19.4 cm.	7.6 in.	60%	21.7 cm.	8.5 in.
3%	19.5 cm.	7.7 in.	65%	21.9 cm.	8.6 in.
5%	19.7 cm.	7.8 in.	70%	22.0 cm.	8.7 in.
10%	20.1 cm.	7.9 in.	75%	22.2 cm.	8.7 in.
15%	20.3 cm.	8.0 in.	80%	22.5 cm.	8.8 in.
20%	20.5 cm.	8.1 in.	85%	22.7 cm.	8.9 in.
25%	20.7 cm.	8.1 in.	90%	23.0 cm.	9.1 in.
30%	20.9 cm.	8.2 in.	95%	23.5 cm.	9.3 in.
35%	21.0 cm.	8.3 in.	97%	23.9 cm.	9.4 in.
40%	21.2 cm.	8.3 in.	98%	24.1 cm.	9.5 in.
45%	21.3 cm.	8.4 in.	99%	24.5 cm.	9.7 in.
50%	21.4 cm.	8.4 in.			

ARM SCYE

Range: 23 to 49 cm.  
9.1 to 19.3 in.

N = 851

Mean:  $36.65 \pm .10$  cm.;  $14.43 \pm .04$  in.

Standard Deviation:  $3.03 \pm .07$  cm.;  $1.19 \pm .03$  in.

Coefficient of Variation:  $8.26 \pm .20$  %

Percentile Values

1%	29.4 cm.	11.6 in.	55%	37.0 cm.	14.6 in.
2%	31.0 cm.	12.2 in.	60%	37.4 cm.	14.7 in.
3%	31.6 cm.	12.5 in.	65%	37.7 cm.	14.8 in.
5%	32.4 cm.	12.8 in.	70%	38.1 cm.	15.0 in.
10%	33.3 cm.	13.1 in.	75%	38.6 cm.	15.2 in.
15%	34.0 cm.	13.4 in.	80%	39.1 cm.	15.4 in.
20%	34.5 cm.	13.6 in.	85%	39.7 cm.	15.6 in.
25%	35.0 cm.	13.8 in.	90%	40.4 cm.	15.9 in.
30%	35.4 cm.	13.9 in.	95%	41.6 cm.	16.4 in.
35%	35.8 cm.	14.1 in.	97%	42.3 cm.	16.7 in.
40%	36.1 cm.	14.2 in.	98%	42.9 cm.	16.9 in.
45%	36.4 cm.	14.3 in.	99%	43.8 cm.	17.3 in.
50%	36.7 cm.	14.5 in.			

AXILLARY ARM CIRCUMFERENCE

Range: 21 to 36 cm.  
8.3 in. to 14.2 in.

N = 850

Mean:  $27.90 \pm .08$  cm.;  $10.99 \pm .03$  in.

Standard Deviation:  $2.40 \pm .06$  cm.;  $.95 \pm .02$  in.

Coefficient of Variation:  $8.61 \pm .21$  %

Percentile Values

1%	22.9 cm.	9.0 in.	55%	28.0 cm.	11.0 in.
2%	23.4 cm.	9.2 in.	60%	28.3 cm.	11.2 in.
3%	23.7 cm.	9.4 in.	65%	28.7 cm.	11.3 in.
5%	24.2 cm.	9.5 in.	70%	29.0 cm.	11.4 in.
10%	24.9 cm.	9.8 in.	75%	29.4 cm.	11.6 in.
15%	25.5 cm.	10.0 in.	80%	29.8 cm.	11.8 in.
20%	25.9 cm.	10.2 in.	85%	30.4 cm.	12.0 in.
25%	26.2 cm.	10.3 in.	90%	31.0 cm.	12.2 in.
30%	26.6 cm.	10.5 in.	95%	32.1 cm.	12.7 in.
35%	26.9 cm.	10.6 in.	97%	32.9 cm.	13.0 in.
40%	27.2 cm.	10.7 in.	98%	33.5 cm.	13.2 in.
45%	27.4 cm.	10.8 in.	99%	34.3 cm.	13.5 in.
50%	27.7 cm.	10.9 in.			

BICEPS CIRCUMFERENCE (FLEXED)

Range: 20 to 37 cm.  
7.9 to 14.6 in.

N = 846

Mean:  $26.67 \pm .08$  cm.;  $10.50 \pm .03$  in.

Standard Deviation:  $2.24 \pm .05$  cm.;  $.88 \pm .02$  in.

Coefficient of Variation:  $8.40 \pm .20$  %

Percentile Values

1%	22.3 cm.	8.8 in.	55%	26.9 cm.	10.6 in.
2%	22.7 cm.	8.9 in.	60%	27.1 cm.	10.7 in.
3%	23.0 cm.	9.1 in.	65%	27.4 cm.	10.8 in.
5%	23.4 cm.	9.2 in.	70%	27.7 cm.	10.9 in.
10%	24.1 cm.	9.5 in.	75%	28.0 cm.	11.0 in.
15%	24.5 cm.	9.6 in.	80%	28.4 cm.	11.2 in.
20%	24.9 cm.	9.8 in.	85%	28.8 cm.	11.3 in.
25%	25.2 cm.	9.9 in.	90%	29.4 cm.	11.6 in.
30%	25.5 cm.	10.0 in.	95%	30.4 cm.	12.0 in.
35%	25.8 cm.	10.2 in.	97%	31.2 cm.	12.3 in.
40%	26.1 cm.	10.3 in.	98%	31.8 cm.	12.5 in.
45%	26.3 cm.	10.4 in.	99%	32.8 cm.	12.9 in.
50%	26.6 cm.	10.5 in.			

ELBOW CIRCUMFERENCE (FLEXED)

Range: 20 to 39 cm.  
7.9 to 15.4 in.

N = 849

Mean: 28.49 ± .09 cm.; 11.22 ± .04 in.

Standard Deviation: 2.73 ± .07 cm.; 1.07 ± .03 in.

Coefficient of Variation: 9.57 ± .23 %

Percentile Values

1%	22.6 cm.	8.9 in.	55%	28.4 cm.	11.2 in.
2%	23.4 cm.	9.2 in.	60%	28.8 cm.	11.3 in.
3%	23.8 cm.	9.4 in.	65%	29.1 cm.	11.5 in.
5%	24.4 cm.	9.6 in.	70%	29.5 cm.	11.6 in.
10%	25.2 cm.	9.9 in.	75%	30.0 cm.	11.8 in.
15%	25.7 cm.	10.1 in.	80%	30.5 cm.	12.0 in.
20%	26.1 cm.	10.3 in.	85%	31.1 cm.	12.2 in.
25%	26.5 cm.	10.4 in.	90%	32.0 cm.	12.6 in.
30%	26.8 cm.	10.6 in.	95%	33.3 cm.	13.1 in.
35%	27.1 cm.	10.7 in.	97%	34.2 cm.	13.5 in.
40%	27.4 cm.	10.8 in.	98%	35.0 cm.	13.8 in.
45%	27.8 cm.	10.9 in.	99%	36.0 cm.	14.2 in.
50%	28.1 cm.	11.0 in.			

LOWER ARM CIRCUMFERENCE (FLEXED)

Range: 15 to 33 cm.  
5.9 to 13.0 in.

N = 845

Mean: 24.10 ± .07 cm.; 9.49 ± .03 in.

Standard Deviation: 2.09 ± .05 cm.; .82 ± .02 in.

Coefficient of Variation: 8.68 ± .21 %

Percentile Values

1%	18.9 cm.	7.4 in.	55%	24.2 cm.	9.5 in.
2%	19.8 cm.	7.8 in.	60%	24.4 cm.	9.6 in.
3%	20.3 cm.	8.0 in.	65%	24.8 cm.	9.8 in.
5%	21.0 cm.	8.3 in.	70%	24.9 cm.	9.8 in.
10%	21.8 cm.	8.6 in.	75%	25.2 cm.	9.9 in.
15%	22.3 cm.	8.8 in.	80%	25.6 cm.	10.1 in.
20%	22.7 cm.	8.9 in.	85%	26.0 cm.	10.2 in.
25%	23.0 cm.	9.1 in.	90%	26.5 cm.	10.4 in.
30%	23.3 cm.	9.2 in.	95%	27.3 cm.	10.7 in.
35%	23.5 cm.	9.2 in.	97%	27.8 cm.	10.9 in.
40%	23.7 cm.	9.3 in.	98%	28.3 cm.	11.1 in.
45%	23.8 cm.	9.4 in.	99%	29.6 cm.	11.6 in.
50%	24.0 cm.	9.4 in.			

WRIST CIRCUMFERENCE

Range: 13 to 20 cm.  
5.1 to 7.9 in.

N = 848

Mean:  $15.44 \pm .04$  cm.;  $6.08 \pm .01$  in.

Standard Deviation:  $1.03 \pm .03$  cm.;  $.41 \pm .01$  in.

Coefficient of Variation:  $6.70 \pm .16$  %

Percentile Values

1%	13.6 cm.	5.4 in.	55%	15.4 cm.	6.1 in.
2%	13.7 cm.	5.4 in.	60%	15.5 cm.	6.1 in.
3%	13.8 cm.	5.4 in.	65%	15.7 cm.	6.2 in.
5%	14.0 cm.	5.5 in.	70%	15.8 cm.	6.2 in.
10%	14.2 cm.	5.6 in.	75%	16.0 cm.	6.3 in.
15%	14.4 cm.	5.7 in.	80%	16.2 cm.	6.4 in.
20%	14.5 cm.	5.7 in.	85%	16.5 cm.	6.5 in.
25%	14.7 cm.	5.8 in.	90%	16.8 cm.	6.6 in.
30%	14.8 cm.	5.8 in.	95%	17.4 cm.	6.9 in.
35%	14.9 cm.	5.9 in.	97%	17.8 cm.	7.0 in.
40%	15.0 cm.	5.9 in.	98%	18.1 cm.	7.1 in.
45%	15.2 cm.	6.0 in.	99%	18.6 cm.	7.3 in.
50%	15.3 cm.	6.0 in.			

SLEEVE INSEAM

Range: 34 to 53 cm.  
13.4 to 20.9 in.

N = 845

Mean: 43.41 ± .09 cm.; 17.09 ± .04 in.

Standard Deviation: 2.63 ± .06 cm.; 1.03 ± .03 in.

Coefficient of Variation: 6.05 ± .15 %

Percentile Values

1%	36.8 cm.	14.5 in.	55%	44.0 cm.	17.3 in.
2%	37.6 cm.	14.8 in.	60%	44.3 cm.	17.4 in.
3%	38.1 cm.	15.0 in.	65%	44.6 cm.	17.6 in.
5%	38.8 cm.	15.3 in.	70%	45.0 cm.	17.7 in.
10%	39.9 cm.	15.7 in.	75%	45.3 cm.	17.8 in.
15%	40.6 cm.	16.0 in.	80%	45.7 cm.	18.0 in.
20%	41.2 cm.	16.2 in.	85%	46.2 cm.	18.2 in.
25%	41.8 cm.	16.4 in.	90%	46.8 cm.	18.4 in.
30%	42.2 cm.	16.6 in.	95%	47.7 cm.	18.8 in.
35%	42.6 cm.	16.8 in.	97%	48.4 cm.	19.0 in.
40%	42.9 cm.	16.9 in.	98%	48.9 cm.	19.3 in.
45%	43.3 cm.	17.0 in.	99%	50.0 cm.	19.7 in.
50%	43.6 cm.	17.2 in.			

SLEEVE LENGTH

Range: 63 to 89 cm.  
24.8 to 35.0 in.

N = 849

Mean:  $75.80 \pm .14$  cm.;  $29.84 \pm .05$  in.

Standard Deviation:  $3.98 \pm .10$  cm.;  $1.57 \pm .04$  in.

Coefficient of Variation:  $5.26 \pm .13$  %

Percentile Values

1%	66.8 cm.	26.3 in.	55%	76.4 cm.	30.1 in.
2%	67.9 cm.	26.7 in.	60%	76.9 cm.	30.3 in.
3%	68.5 cm.	27.0 in.	65%	77.4 cm.	30.5 in.
5%	69.5 cm.	27.4 in.	70%	78.0 cm.	30.7 in.
10%	70.9 cm.	27.9 in.	75%	78.5 cm.	30.9 in.
15%	71.8 cm.	28.3 in.	80%	79.2 cm.	31.2 in.
20%	72.6 cm.	28.6 in.	85%	80.0 cm.	31.5 in.
25%	73.3 cm.	28.9 in.	90%	80.9 cm.	31.9 in.
30%	73.9 cm.	29.1 in.	95%	82.3 cm.	32.4 in.
35%	74.4 cm.	29.3 in.	97%	83.3 cm.	32.8 in.
40%	74.9 cm.	29.5 in.	98%	84.3 cm.	33.2 in.
45%	75.4 cm.	29.7 in.	99%	85.7 cm.	33.7 in.
50%	75.9 cm.	29.9 in.			

### SHOULDER LENGTH

Range: 11 to 21 cm.  
4.3 to 8.3 in.

N = 846

Mean:  $16.24 \pm .05$  cm.;  $6.39 \pm .02$  in.

Standard Deviation:  $1.33 \pm .03$  cm.;  $.52 \pm .01$  in.

Coefficient of Variation:  $8.18 \pm .20$  %

### Percentile Values

1%	13.1 cm.	5.2 in.	55%	16.4 cm.	6.5 in.
2%	13.5 cm.	5.3 in.	60%	16.6 cm.	6.5 in.
3%	13.8 cm.	5.4 in.	65%	16.7 cm.	6.6 in.
5%	14.1 cm.	5.5 in.	70%	16.9 cm.	6.7 in.
10%	14.6 cm.	5.7 in.	75%	17.1 cm.	6.7 in.
15%	14.9 cm.	5.9 in.	80%	17.3 cm.	6.8 in.
20%	15.2 cm.	6.0 in.	85%	17.6 cm.	6.9 in.
25%	15.4 cm.	6.1 in.	90%	17.9 cm.	7.1 in.
30%	15.6 cm.	6.1 in.	95%	18.4 cm.	7.3 in.
35%	15.7 cm.	6.2 in.	97%	18.8 cm.	7.4 in.
40%	15.9 cm.	6.3 in.	98%	19.0 cm.	7.5 in.
45%	16.1 cm.	6.3 in.	99%	19.5 cm.	7.7 in.
50%	16.2 cm.	6.4 in.			

BIACROMIAL ARC

Range: 34 to 58 cm.  
13.4 to 22.8 in.

N = 843

Mean: 47.30 ± .11 cm.; 18.62 ± .04 in.

Standard Deviation: 3.24 ± .08 cm.; 1.28 ± .03 in.

Coefficient of Variation: 6.85 ± .17 %

Percentile Values

1%	38.3 cm.	15.1 in.	55%	47.7 cm.	18.8 in.
2%	39.7 cm.	15.6 in.	60%	48.2 cm.	19.0 in.
3%	40.5 cm.	15.9 in.	65%	48.6 cm.	19.1 in.
5%	41.6 cm.	16.4 in.	70%	49.0 cm.	19.3 in.
10%	43.1 cm.	17.0 in.	75%	49.4 cm.	19.4 in.
15%	44.0 cm.	17.3 in.	80%	49.9 cm.	19.6 in.
20%	44.7 cm.	17.6 in.	85%	50.4 cm.	19.8 in.
25%	45.2 cm.	17.8 in.	90%	51.1 cm.	20.1 in.
30%	45.7 cm.	18.0 in.	95%	52.2 cm.	20.5 in.
35%	46.2 cm.	18.2 in.	97%	52.9 cm.	20.8 in.
40%	46.6 cm.	18.3 in.	98%	53.4 cm.	21.0 in.
45%	47.0 cm.	18.5 in.	99%	54.2 cm.	21.3 in.
50%	47.4 cm.	18.6 in.			

WAIST BACK

Range: 30 to 50 cm.  
11.8 to 19.7 in.

N = 847

Mean:  $39.37 \pm .10$  cm.;  $15.51 \pm .04$  in.

Standard Deviation:  $2.98 \pm .07$  cm.;  $1.17 \pm .03$  in.

Coefficient of Variation:  $7.51 \pm .18$  %

Percentile Values

1%	33.1 cm.	13.0 in.	55%	39.6 cm.	15.6 in.
2%	33.9 cm.	13.3 in.	60%	39.9 cm.	15.7 in.
3%	34.4 cm.	13.5 in.	65%	40.3 cm.	15.9 in.
5%	35.0 cm.	13.8 in.	70%	40.7 cm.	16.0 in.
10%	35.9 cm.	14.1 in.	75%	41.2 cm.	16.2 in.
15%	36.5 cm.	14.4 in.	80%	41.6 cm.	16.4 in.
20%	37.0 cm.	14.6 in.	85%	42.2 cm.	16.6 in.
25%	37.4 cm.	14.7 in.	90%	43.0 cm.	16.9 in.
30%	37.8 cm.	14.9 in.	95%	44.2 cm.	17.4 in.
35%	38.2 cm.	15.0 in.	97%	45.1 cm.	17.8 in.
40%	38.6 cm.	15.2 in.	98%	45.7 cm.	18.0 in.
45%	38.9 cm.	15.3 in.	99%	47.5 cm.	18.7 in.
50%	39.3 cm.	15.5 in.			

WAIST FRONT TO CERVICALE

Range: 40 to 61 cm.  
15.7 to 24.0 in.

N = 849

Mean:  $51.07 \pm .09$  cm.;  $20.11 \pm .04$  in.

Standard Deviation:  $2.72 \pm .06$  cm.;  $1.08 \pm .03$  in.

Coefficient of Variation:  $5.33 \pm .13$  %

Percentile Values

1%	43.7 cm.	17.2 in.	55%	51.3 cm.	20.2 in.
2%	45.4 cm.	17.9 in.	60%	51.7 cm.	20.4 in.
3%	46.0 cm.	18.1 in.	65%	52.0 cm.	20.5 in.
5%	46.7 cm.	18.4 in.	70%	52.4 cm.	20.6 in.
10%	47.7 cm.	18.8 in.	75%	52.7 cm.	20.7 in.
15%	48.5 cm.	19.1 in.	80%	53.3 cm.	21.0 in.
20%	49.0 cm.	19.3 in.	85%	53.9 cm.	21.2 in.
25%	49.4 cm.	19.4 in.	90%	54.6 cm.	21.5 in.
30%	49.7 cm.	19.6 in.	95%	55.7 cm.	21.9 in.
35%	50.1 cm.	19.7 in.	97%	56.5 cm.	22.2 in.
40%	50.4 cm.	19.8 in.	98%	56.9 cm.	22.4 in.
45%	50.7 cm.	20.0 in.	99%	57.9 cm.	22.8 in.
50%	51.0 cm.	20.1 in.			

GLUTEAL ARC

Range: 22 to 39 cm.

N = 839

8.7 to 15.4 in.

Mean: 29.08 ± .08 cm.; 11.45 ± .03 in.

Standard Deviation: 2.34 ± .06 cm.; .92 ± .02 in.

Coefficient of Variation: 8.04 ± .20 %

Percentile Values

1%	24.3 cm.	9.6 in.	55%	29.3 cm.	11.5 in.
2%	24.8 cm.	9.8 in.	60%	29.6 cm.	11.6 in.
3%	25.2 cm.	9.9 in.	65%	29.9 cm.	11.8 in.
5%	25.7 cm.	10.1 in.	70%	30.2 cm.	11.9 in.
10%	26.4 cm.	10.4 in.	75%	30.5 cm.	12.0 in.
15%	26.9 cm.	10.6 in.	80%	31.0 cm.	12.2 in.
20%	27.2 cm.	10.7 in.	85%	31.4 cm.	12.4 in.
25%	27.6 cm.	10.9 in.	90%	32.1 cm.	12.6 in.
30%	27.9 cm.	11.0 in.	95%	33.2 cm.	13.1 in.
35%	28.2 cm.	11.1 in.	97%	34.0 cm.	13.4 in.
40%	28.5 cm.	11.2 in.	98%	34.7 cm.	13.7 in.
45%	28.7 cm.	11.3 in.	99%	35.9 cm.	14.1 in.
50%	29.0 cm.	11.4 in.			

CROTCH LENGTH

Range: 50 to 84 cm.  
19.7 to 33.1 in.

N = 848

Mean:  $69.64 \pm .17$  cm.;  $27.42 \pm .07$  in.

Standard Deviation:  $4.99 \pm .12$  cm.;  $1.97 \pm .05$  in.

Coefficient of Variation:  $7.17 \pm .17$  %

Percentile Values

1%	56.5 cm.	22.2 in.	55%	70.7 cm.	27.8 in.
2%	58.3 cm.	23.0 in.	60%	71.3 cm.	28.1 in.
3%	59.4 cm.	23.4 in.	65%	71.9 cm.	28.3 in.
5%	60.8 cm.	23.9 in.	70%	72.5 cm.	28.5 in.
10%	63.0 cm.	24.8 in.	75%	73.2 cm.	28.8 in.
15%	64.6 cm.	25.4 in.	80%	73.9 cm.	29.1 in.
20%	65.8 cm.	25.9 in.	85%	74.8 cm.	29.4 in.
25%	66.8 cm.	26.3 in.	90%	75.9 cm.	29.9 in.
30%	67.7 cm.	26.7 in.	95%	77.5 cm.	30.5 in.
35%	68.4 cm.	26.9 in.	97%	78.6 cm.	30.9 in.
40%	69.1 cm.	27.2 in.	98%	79.4 cm.	31.3 in.
45%	69.7 cm.	27.4 in.	99%	80.4 cm.	31.7 in.
50%	70.2 cm.	27.6 in.			

VERTICAL TRUNK CIRCUMFERENCE

Range: 137 to 170 cm.  
53.9 to 66.9 in.

N = 845

Mean:  $151.71 \pm .21$  cm.;  $59.73 \pm .08$  in.

Standard Deviation:  $6.21 \pm .20$  cm.;  $2.44 \pm .08$  in.

Coefficient of Variation:  $4.09 \pm .13$  %

Percentile Values

1%	138.6 cm.	54.6 in.	55%	151.7 cm.	59.7 in.
2%	139.6 cm.	55.0 in.	60%	152.6 cm.	60.1 in.
3%	140.5 cm.	55.3 in.	65%	153.4 cm.	60.4 in.
5%	141.6 cm.	55.7 in.	70%	154.3 cm.	60.7 in.
10%	143.5 cm.	56.5 in.	75%	155.5 cm.	61.2 in.
15%	145.0 cm.	57.1 in.	80%	156.7 cm.	61.7 in.
20%	146.2 cm.	57.6 in.	85%	158.1 cm.	62.2 in.
25%	147.0 cm.	57.9 in.	90%	159.5 cm.	62.8 in.
30%	147.8 cm.	58.2 in.	95%	161.6 cm.	63.6 in.
35%	148.6 cm.	58.5 in.	97%	162.9 cm.	64.1 in.
40%	149.4 cm.	58.8 in.	98%	163.9 cm.	64.5 in.
45%	150.2 cm.	59.1 in.	99%	165.9 cm.	65.3 in.
50%	150.9 cm.	59.4 in.			

INTERSCYE

Range: 34 to 56 cm.  
13.4 to 22.0 in.

N = 847

Mean:  $45.09 \pm .11$  cm.;  $17.75 \pm .04$  in.

Standard Deviation:  $3.22 \pm .08$  cm.;  $1.27 \pm .03$  in.

Coefficient of Variation:  $7.14 \pm .17$  %

Percentile Values:

1%	37.4 cm.	14.7 in.	55%	45.4 cm.	17.9 in.
2%	38.3 cm.	15.1 in.	60%	45.8 cm.	18.0 in.
3%	38.9 cm.	15.3 in.	65%	46.2 cm.	18.2 in.
5%	39.7 cm.	15.6 in.	70%	46.7 cm.	18.4 in.
10%	40.9 cm.	16.1 in.	75%	47.2 cm.	18.6 in.
15%	41.7 cm.	16.4 in.	80%	47.8 cm.	18.8 in.
20%	42.3 cm.	16.7 in.	85%	48.4 cm.	19.1 in.
25%	42.8 cm.	16.9 in.	90%	49.1 cm.	19.3 in.
30%	43.3 cm.	17.0 in.	95%	50.6 cm.	19.9 in.
35%	43.7 cm.	17.2 in.	97%	51.6 cm.	20.3 in.
40%	44.2 cm.	17.4 in.	98%	52.2 cm.	20.6 in.
45%	44.6 cm.	17.6 in.	99%	53.4 cm.	21.0 in.
50%	45.0 cm.	17.7 in.			

INTERSCYE MAXIMUM

Range: 37 to 58 cm.  
14.6 to 22.8 in.

N = 852

Mean: 47.78 ± .11 cm.; 18.81 ± .04 in.

Standard Deviation: 3.12 ± .08 cm.; 1.23 ± .03 in.

Coefficient of Variation: 6.53 ± .16 %

Percentile Values

1%	39.8 cm.	15.7 in.	55%	48.6 cm.	19.1 in.
2%	41.1 cm.	16.2 in.	60%	49.0 cm.	19.3 in.
3%	41.8 cm.	16.5 in.	65%	49.4 cm.	19.4 in.
5%	42.7 cm.	16.8 in.	70%	49.8 cm.	19.6 in.
10%	44.0 cm.	17.3 in.	75%	50.3 cm.	19.8 in.
15%	44.8 cm.	17.6 in.	80%	50.8 cm.	20.0 in.
20%	45.4 cm.	17.9 in.	85%	51.4 cm.	20.2 in.
25%	46.0 cm.	18.1 in.	90%	52.2 cm.	20.5 in.
30%	46.5 cm.	18.3 in.	95%	53.3 cm.	21.0 in.
35%	47.0 cm.	18.5 in.	97%	54.0 cm.	21.3 in.
40%	47.4 cm.	18.7 in.	98%	54.6 cm.	21.5 in.
45%	47.8 cm.	18.8 in.	99%	55.4 cm.	21.8 in.
50%	48.2 cm.	19.0 in.			

### HIP CIRCUMFERENCE

Range: 83 to 122 cm.  
32.7 to 48.0 in.

N = 848

Mean: 99.62 ± .19 cm.; 39.22 ± .08 in.

Standard Deviation: 5.66 ± .14 cm.; 2.23 ± .05 in.

Coefficient of Variation: 5.68 ± .14 %

### Percentile Values

1%	87.4 cm.	34.4 in.	55%	100.0 cm.	39.4 in.
2%	89.1 cm.	35.1 in.	60%	100.7 cm.	39.6 in.
3%	90.0 cm.	35.4 in.	65%	101.3 cm.	39.9 in.
5%	91.3 cm.	35.9 in.	70%	102.1 cm.	40.2 in.
10%	93.1 cm.	36.7 in.	75%	102.9 cm.	40.5 in.
15%	94.3 cm.	37.1 in.	80%	103.9 cm.	40.9 in.
20%	95.3 cm.	37.5 in.	85%	105.0 cm.	41.3 in.
25%	96.0 cm.	37.8 in.	90%	106.5 cm.	41.9 in.
30%	96.8 cm.	38.1 in.	95%	109.3 cm.	43.0 in.
35%	97.4 cm.	38.4 in.	97%	111.5 cm.	43.9 in.
40%	98.1 cm.	38.6 in.	98%	113.4 cm.	44.6 in.
45%	98.7 cm.	38.8 in.	99%	115.8 cm.	45.6 in.
50%	99.4 cm.	39.1 in.			

KNEE CIRCUMFERENCE

Range: 28 to 49 cm.  
11.0 to 19.3 in.

N = 850

Mean:  $37.29 \pm .09$  cm.;  $14.68 \pm .04$  in.

Standard Deviation:  $2.69 \pm .06$  cm.;  $1.06 \pm .03$  in.

Coefficient of Variation:  $7.21 \pm .17$  %

Percentile Values

1%	31.7 cm.	12.5 in.	55%	37.4 cm.	14.7 in.
2%	32.6 cm.	12.8 in.	60%	37.7 cm.	14.9 in.
3%	33.1 cm.	13.1 in.	65%	38.0 cm.	15.0 in.
5%	33.6 cm.	13.2 in.	70%	38.4 cm.	15.1 in.
10%	34.3 cm.	13.5 in.	75%	38.8 cm.	15.3 in.
15%	34.8 cm.	13.7 in.	80%	39.4 cm.	15.5 in.
20%	35.2 cm.	13.9 in.	85%	40.0 cm.	15.8 in.
25%	35.5 cm.	14.0 in.	90%	40.8 cm.	16.1 in.
30%	35.8 cm.	14.1 in.	95%	42.2 cm.	16.6 in.
35%	36.2 cm.	14.3 in.	97%	43.2 cm.	17.0 in.
40%	36.4 cm.	14.4 in.	98%	43.9 cm.	17.3 in.
45%	36.8 cm.	14.5 in.	99%	45.3 cm.	17.8 in.
50%	37.0 cm.	14.6 in.			

FOOT LENGTH

Range: 203 to 290. mm.  
8.0 to 11.4 in.

N = 850

Mean:  $239.43 \pm .41$  mm.;  $9.43 \pm .00$  in.

Standard Deviation:  $11.71 \pm 0.28$  mm.;  $0.46 \pm .00$  in.

Coefficient of Variation:  $4.89 \pm .12$  %

Percentile Values

1%	213.9 mm.	8.42 in.	55%	241.1 mm.	9.49 in.
2%	217.2 mm.	8.55 in.	60%	242.6 mm.	9.55 in.
3%	219.1 mm.	8.63 in.	65%	243.8 mm.	9.60 in.
5%	222.3 mm.	8.74 in.	70%	245.2 mm.	9.65 in.
10%	226.0 mm.	8.90 in.	75%	247.0 mm.	9.72 in.
15%	228.6 mm.	9.00 in.	80%	248.9 mm.	9.80 in.
20%	230.5 mm.	9.07 in.	85%	251.2 mm.	9.89 in.
25%	232.4 mm.	9.15 in.	90%	254.0 mm.	10.00 in.
30%	234.3 mm.	9.22 in.	95%	257.9 mm.	10.15 in.
35%	235.6 mm.	9.28 in.	97%	260.6 mm.	10.26 in.
40%	237.0 mm.	9.33 in.	98%	262.9 mm.	10.35 in.
45%	238.5 mm.	9.39 in.	99%	266.1 mm.	10.48 in.
50%	239.8 mm.	9.44 in.			

INSTEP LENGTH

Range: 140 to 206 mm.  
5.5 to 8.1 in.

N = 847

Mean: 173.19 ± .28 mm., 6.82 ± 0.01 in.

Standard Deviation: 8.17 ± .20 mm.; 0.32 ± .08 in.

Coefficient of Variation: 4.72 ± .15 %

Percentile Values

1%	153.8 mm.	6.06 in.	55%	174.3 mm.	6.86 in.
2%	156.4 mm.	6.16 in.	60%	175.3 mm.	6.90 in.
3%	158.0 mm.	6.22 in.	65%	176.4 mm.	6.94 in.
5%	160.0 mm.	6.30 in.	70%	177.4 mm.	6.98 in.
10%	162.9 mm.	6.41 in.	75%	178.6 mm.	7.03 in.
15%	164.5 mm.	6.48 in.	80%	179.8 mm.	7.08 in.
20%	165.9 mm.	6.53 in.	85%	181.2 mm.	7.13 in.
25%	167.3 mm.	6.59 in.	90%	183.0 mm.	7.20 in.
30%	168.8 mm.	6.65 in.	95%	185.6 mm.	7.31 in.
35%	170.1 mm.	6.70 in.	97%	187.4 mm.	7.38 in.
40%	171.2 mm.	6.74 in.	98%	188.8 mm.	7.43 in.
45%	172.3 mm.	6.78 in.	99%	191.0 mm.	7.52 in.
50%	173.3 mm.	6.82 in.			

FOOT WIDTH

Range: 76 to 110 mm.  
3.0 to 4.4

N = 849

Mean: 90.88 ± .18 mm.; 3.58 ± .01 in.

Standard Deviation: 5.28 ± .13 mm.; .20 ± .01 in.

Coefficient of Variation: 5.82 ± .14 %

Percentile Values

1%	78.9 mm.	3.10 in.	55%	91.9 mm.	3.62 in.
2%	80.1 mm.	3.15 in.	60%	92.6 mm.	3.64 in.
3%	81.1 mm.	3.19 in.	65%	93.3 mm.	3.67 in.
5%	82.3 mm.	3.24 in.	70%	94.1 mm.	3.71 in.
10%	84.2 mm.	3.31 in.	75%	94.9 mm.	3.73 in.
15%	85.5 mm.	3.37 in.	80%	95.6 mm.	3.76 in.
20%	86.6 mm.	3.40 in.	85%	96.6 mm.	3.81 in.
25%	87.5 mm.	3.44 in.	90%	97.8 mm.	3.85 in.
30%	88.4 mm.	3.48 in.	95%	99.3 mm.	3.91 in.
35%	89.2 mm.	3.51 in.	97%	100.2 mm.	3.95 in.
40%	89.9 mm.	3.54 in.	98%	101.0 mm.	3.98 in.
45%	90.6 mm.	3.57 in.	99%	101.9 mm.	4.01 in.
50%	91.3 mm.	3.59 in.			

HEEL WIDTH

Range: 39 to 75 mm.  
1.5 to 2.3 in.

N = 847

Mean: 57.16 ± .20 mm.; 2.25 ± .01 in.

Standard Deviation: 5.73 ± .14 mm.; .23 ± .01 in.

Coefficient of Variation: 10.02 ± .24 %

Percentile Values

1%	40.4 mm.	1.59 in.	55%	58.0 mm.	2.29 in.
2%	42.9 mm.	1.69 in.	60%	58.6 mm.	2.31 in.
3%	44.5 mm.	1.75 in.	65%	59.4 mm.	2.34 in.
5%	46.7 mm.	1.84 in.	70%	60.1 mm.	2.37 in.
10%	49.7 mm.	1.96 in.	75%	60.9 mm.	2.40 in.
15%	51.5 mm.	2.03 in.	80%	61.8 mm.	2.43 in.
20%	52.9 mm.	2.08 in.	85%	62.9 mm.	2.48 in.
25%	53.9 mm.	2.12 in.	90%	64.2 mm.	2.53 in.
30%	54.8 mm.	2.16 in.	95%	66.1 mm.	2.60 in.
35%	55.5 mm.	2.19 in.	97%	67.2 mm.	2.65 in.
40%	56.2 mm.	2.21 in.	98%	68.1 mm.	2.68 in.
45%	56.9 mm.	2.24 in.	99%	69.4 mm.	2.73 in.
50%	57.5 mm.	2.26 in.			

BALL OF FOOT CIRCUMFERENCE

Range: 19 to 28 cm.  
7.5 to 11.0 in.

N = 848

Mean:  $23.30 \pm .04$  cm.;  $9.17 \pm .02$  in.

Standard Deviation:  $1.23 \pm .03$  cm.;  $.48 \pm .01$  in.

Coefficient of Variation:  $5.30 \pm .13$  %

Percentile Values

1%	20.5 cm.	8.1 in.	55%	23.4 cm.	9.2 in.
2%	20.8 cm.	8.2 in.	60%	23.6 cm.	9.3 in.
3%	21.0 cm.	8.3 in.	65%	23.8 cm.	9.4 in.
5%	21.3 cm.	8.4 in.	70%	24.0 cm.	9.4 in.
10%	21.7 cm.	8.6 in.	75%	24.2 cm.	9.5 in.
15%	22.0 cm.	8.7 in.	80%	24.4 cm.	9.6 in.
20%	22.3 cm.	8.8 in.	85%	24.7 cm.	9.7 in.
25%	22.4 cm.	8.8 in.	90%	25.0 cm.	9.8 in.
30%	22.6 cm.	8.9 in.	95%	25.5 cm.	10.1 in.
35%	22.8 cm.	9.0 in.	97%	25.9 cm.	10.2 in.
40%	23.0 cm.	9.0 in.	98%	26.2 cm.	10.3 in.
45%	23.1 cm.	9.1 in.	99%	26.6 cm.	10.5 in.
50%	23.3 cm.	9.2 in.			

### HAND LENGTH

Range: 149 to 207 mm.  
5.9 to 8.2 in.

N = 851

Mean: 171.74 ± .30 mm.; 6.76 ± .01 in.

Standard Deviation: 8.75 ± .21 mm.; .34 ± .01 in.

Coefficient of Variation: 5.10 ± .12 %

### Percentile Values

1%	153.2 mm.	6.03 in.	55%	173.1 mm.	6.82 in.
2%	155.1 mm.	6.11 in.	60%	174.1 mm.	6.85 in.
3%	156.5 mm.	6.16 in.	65%	175.3 mm.	6.90 in.
5%	158.2 mm.	6.23 in.	70%	176.5 mm.	6.95 in.
10%	160.5 mm.	6.32 in.	75%	177.9 mm.	7.00 in.
15%	162.2 mm.	6.39 in.	80%	179.2 mm.	7.06 in.
20%	163.8 mm.	6.45 in.	85%	181.0 mm.	7.13 in.
25%	165.1 mm.	6.50 in.	90%	183.0 mm.	7.21 in.
30%	166.7 mm.	6.56 in.	95%	185.9 mm.	7.33 in.
35%	168.1 mm.	6.62 in.	97%	188.2 mm.	7.41 in.
40%	169.5 mm.	6.67 in.	98%	189.9 mm.	7.48 in.
45%	170.7 mm.	6.72 in.	99%	194.0 mm.	7.64 in.
50%	171.9 mm.	6.77 in.			

HAND BREADTH AT METACARPALE

Range: 63 to 96 mm.  
2.5 to 3.8 in.

N = 851

Mean:  $76.61 \pm .17$  mm.;  $3.02 \pm .01$  in.

Standard Deviation:  $4.92 \pm .12$  mm.;  $.19 \pm .00$  in.

Coefficient of Variation:  $6.42 \pm .16\%$

Percentile Values

1%	66.4 mm.	2.61 in.	55%	77.2 mm.	3.04 in.
2%	67.4 mm.	2.66 in.	60%	77.8 mm.	3.06 in.
3%	68.1 mm.	2.68 in.	65%	78.5 mm.	3.09 in.
5%	69.1 mm.	2.72 in.	70%	79.1 mm.	3.11 in.
10%	70.5 mm.	2.78 in.	75%	79.8 mm.	3.14 in.
15%	71.7 mm.	2.82 in.	80%	80.7 mm.	3.18 in.
20%	72.6 mm.	2.86 in.	85%	81.7 mm.	3.22 in.
25%	73.3 mm.	2.89 in.	90%	82.8 mm.	3.26 in.
30%	74.0 mm.	2.91 in.	95%	85.3 mm.	3.36 in.
35%	74.7 mm.	2.94 in.	97%	86.9 mm.	3.42 in.
40%	75.3 mm.	2.96 in.	98%	88.3 mm.	3.48 in.
45%	75.9 mm.	2.99 in.	99%	90.5 mm.	3.56 in.
50%	76.5 mm.	3.01 in.			

HAND BREADTH AT THUMB

Range: 75 to 107 mm.  
2.9 to 4.2 in.

N = 844

Mean: 91.78 ± .20 mm.; 3.61 ± .01 in.

Standard Deviation: 5.86 ± .14 mm.; .23 ± .01 in.

Coefficient of Variation: 6.39 ± .16 %

Percentile Values

1%	78.3 mm.	3.08 in.	55%	92.7 mm.	3.65 in.
2%	79.8 mm.	3.14 in.	60%	93.4 mm.	3.68 in.
3%	80.8 mm.	3.18 in.	65%	94.1 mm.	3.70 in.
5%	82.2 mm.	3.24 in.	70%	94.8 mm.	3.73 in.
10%	84.3 mm.	3.32 in.	75%	95.7 mm.	3.77 in.
15%	85.8 mm.	3.38 in.	80%	96.6 mm.	3.80 in.
20%	87.0 mm.	3.43 in.	85%	97.7 mm.	3.85 in.
25%	88.1 mm.	3.47 in.	90%	99.1 mm.	3.90 in.
30%	89.0 mm.	3.50 in.	95%	101.2 mm.	3.99 in.
35%	89.8 mm.	3.53 in.	97%	102.7 mm.	4.04 in.
40%	90.5 mm.	3.56 in.	98%	103.7 mm.	4.08 in.
45%	91.3 mm.	3.59 in.	99%	105.2 mm.	4.14 in.
50%	92.0 mm.	3.62 in.			

THICKNESS AT METACARPALE

Range: 19 to 36 mm.  
.75 to 1.4 in.

N = 850

Mean:  $24.75 \pm .08$  mm.;  $.97 \pm .00$  in.

Standard Deviation:  $2.38 \pm .06$  mm.;  $.09 \pm .00$  in.

Coefficient of Variation:  $9.60 \pm .23$  %

Percentile Values

1%	20.5 mm.	.81 in.	55%	24.8 mm.	.98 in.
2%	20.8 mm.	.82 in.	60%	25.1 mm.	.99 in.
3%	21.0 mm.	.83 in.	65%	25.4 mm.	1.00 in.
5%	21.3 mm.	.84 in.	70%	25.7 mm.	1.01 in.
10%	21.9 mm.	.86 in.	75%	26.2 mm.	1.03 in.
15%	22.3 mm.	.88 in.	80%	26.7 mm.	1.05 in.
20%	22.7 mm.	.89 in.	85%	27.2 mm.	1.07 in.
25%	23.0 mm.	.90 in.	90%	27.9 mm.	1.09 in.
30%	23.3 mm.	.92 in.	95%	29.1 mm.	1.14 in.
35%	23.6 mm.	.93 in.	97%	29.8 mm.	1.17 in.
40%	23.9 mm.	.94 in.	98%	30.3 mm.	1.19 in.
45%	24.2 mm.	.95 in.	99%	31.3 mm.	1.23 in.
50%	24.5 mm.	.96 in.			

PALM LENGTH

Range: 74 to 114 mm.

N = 850

2.9 to 4.5 in.

Mean: 94.97  $\pm$  .22 mm.; 3.74  $\pm$  .01 in.

Standard Deviation: 6.38  $\pm$  .15 mm.; .25  $\pm$  .01 in.

Coefficient of Variation: 6.72  $\pm$  .16 %

Percentile Values

1%	80.3 mm.	3.16 in.	55%	95.5 mm.	3.76 in.
2%	82.3 mm.	3.24 in.	60%	96.3 mm.	3.79 in.
3%	83.3 mm.	3.28 in.	65%	97.1 mm.	3.82 in.
5%	84.5 mm.	3.33 in.	70%	98.0 mm.	3.86 in.
10%	86.6 mm.	3.41 in.	75%	99.0 mm.	3.90 in.
15%	88.0 mm.	3.47 in.	80%	100.0 mm.	3.94 in.
20%	89.3 mm.	3.52 in.	85%	101.2 mm.	3.99 in.
25%	90.4 mm.	3.56 in.	90%	102.9 mm.	4.05 in.
30%	91.4 mm.	3.60 in.	95%	105.5 mm.	4.15 in.
35%	92.4 mm.	3.64 in.	97%	107.4 mm.	4.23 in.
40%	93.3 mm.	3.67 in.	98%	109.0 mm.	4.29 in.
45%	94.0 mm.	3.71 in.	99%	112.2 mm.	4.42 in.
50%	94.8 mm.	3.73 in.			

PALM CIRCUMFERENCE

Range: 14 to 27 cm.  
5.5 to 10.6 in.

N = 851

Mean: 18.99 ± .04 cm.; 7.48 ± .02 in.

Standard Deviation: 1.17 ± .03 cm.; .46 ± .01 in.

Coefficient of Variation: 6.14 ± .15 %

Percentile Values

1%	16.7 cm.	6.6 in.	55%	19.1 cm.	7.5 in.
2%	17.0 cm.	6.7 in.	60%	19.2 cm.	7.6 in.
3%	17.2 cm.	6.8 in.	65%	19.3 cm.	7.6 in.
5%	17.4 cm.	6.9 in.	70%	19.5 cm.	7.7 in.
10%	17.7 cm.	7.0 in.	75%	19.6 cm.	7.7 in.
15%	18.0 cm.	7.1 in.	80%	19.8 cm.	7.8 in.
20%	18.2 cm.	7.2 in.	85%	20.0 cm.	7.9 in.
25%	18.4 cm.	7.2 in.	90%	20.3 cm.	8.0 in.
30%	18.5 cm.	7.3 in.	95%	20.7 cm.	8.1 in.
35%	18.6 cm.	7.3 in.	97%	21.0 cm.	8.3 in.
40%	18.7 cm.	7.4 in.	98%	21.3 cm.	8.4 in.
45%	18.9 cm.	7.4 in.	99%	21.8 cm.	8.6 in.
50%	19.0 cm.	7.5 in.			

FIST CIRCUMFERENCE

Range: 21 to 29 cm.  
8.3 to 11.4 in.

N = 851

Mean: 25.08 ± .05 cm.; 9.87 ± .03 in.

Standard Deviation: 1.32 ± .02 cm.; .52 ± .01 in.

Coefficient of Variation: 5.27 ± .13 %

Percentile Values

1%	22.1 cm.	8.7 in.	55%	25.2 cm.	9.9 in.
2%	22.4 cm.	8.8 in.	60%	25.4 cm.	10.0 in.
3%	22.6 cm.	8.9 in.	65%	25.6 cm.	10.1 in.
5%	23.0 cm.	9.1 in.	70%	25.8 cm.	10.1 in.
10%	23.4 cm.	9.2 in.	75%	26.0 cm.	10.2 in.
15%	23.7 cm.	9.3 in.	80%	26.2 cm.	10.3 in.
20%	24.0 cm.	9.4 in.	85%	26.4 cm.	10.4 in.
25%	24.2 cm.	9.5 in.	90%	26.7 cm.	10.5 in.
30%	24.4 cm.	9.6 in.	95%	27.2 cm.	10.7 in.
35%	24.6 cm.	9.7 in.	97%	27.5 cm.	10.8 in.
40%	24.7 cm.	9.7 in.	98%	27.7 cm.	10.9 in.
45%	24.9 cm.	9.8 in.	99%	28.1 cm.	11.0 in.
50%	25.1 cm.	9.9 in.			

HEAD LENGTH

Range: 151 to 198 mm.  
5.9 to 7.8 in.

N = 847

Mean:  $173.78 \pm .26$  mm.;  $6.84 \pm .01$  in.

Standard Deviation:  $7.50 \pm .18$  mm.;  $.30 \pm .01$  in.

Coefficient of Variation:  $4.31 \pm .10$  %

Percentile Values

1%	155.4 mm.	6.12 in.	55%	175.4 mm.	6.91 in.
2%	158.1 mm.	6.22 in.	60%	176.2 mm.	6.94 in.
3%	159.6 mm.	6.28 in.	65%	177.3 mm.	6.98 in.
5%	161.6 mm.	6.36 in.	70%	178.3 mm.	7.03 in.
10%	164.6 mm.	6.48 in.	75%	179.3 mm.	7.06 in.
15%	166.5 mm.	6.56 in.	80%	180.5 mm.	7.11 in.
20%	168.0 mm.	6.61 in.	85%	181.8 mm.	7.16 in.
25%	169.4 mm.	6.67 in.	90%	183.5 mm.	7.22 in.
30%	170.6 mm.	6.71 in.	95%	186.0 mm.	7.32 in.
35%	171.6 mm.	6.75 in.	97%	187.6 mm.	7.39 in.
40%	172.5 mm.	6.79 in.	98%	188.2 mm.	7.41 in.
45%	173.5 mm.	6.83 in.	99%	189.8 mm.	7.47 in.
50%	174.5 mm.	6.87 in.			

HEAD BREADTH

Range: 131 to 164 mm.  
5.2 to 6.5 in.

N = 847

Mean: 144.94 ± .17 mm.: 5.71 ± .01 in.

Standard Deviation: 5.00 ± .12 mm.; .20 ± .00 in.

Coefficient of Variation: 3.45 ± .08 %

Percentile Values

1%	133.7 mm.	5.26 in.	55%	145.6 mm.	5.73 in.
2%	134.8 mm.	5.31 in.	60%	146.2 mm.	5.76 in.
3%	135.5 mm.	5.33 in.	65%	146.9 mm.	5.78 in.
5%	136.6 mm.	5.38 in.	70%	147.6 mm.	5.81 in.
10%	138.3 mm.	5.44 in.	75%	148.3 mm.	5.84 in.
15%	139.5 mm.	5.49 in.	80%	149.1 mm.	5.87 in.
20%	140.5 mm.	5.53 in.	85%	150.2 mm.	5.91 in.
25%	141.3 mm.	5.56 in.	90%	151.5 mm.	5.96 in.
30%	142.1 mm.	5.59 in.	95%	153.7 mm.	6.05 in.
35%	142.9 mm.	5.63 in.	97%	155.0 mm.	6.10 in.
40%	143.6 mm.	5.65 in.	98%	155.9 mm.	6.14 in.
45%	144.3 mm.	5.68 in.	99%	157.7 mm.	6.21 in.
50%	144.9 mm.	5.70 in.			

HEAD CIRCUMFERENCE

Range: 49 to 63 cm.  
19.3 to 24.8 in.

N = 847

Mean:  $54.59 \pm .06$  cm.;  $21.49 \pm .02$  in.

Standard Deviation:  $1.73 \pm .04$  cm.;  $.68 \pm .02$  in.

Coefficient of Variation:  $3.17 \pm .08$  %

Percentile Values

1%	50.77 cm.	19.99 in.	55%	54.57 cm.	21.48 in.
2%	51.16 cm.	20.14 in.	60%	54.82 cm.	21.58 in.
3%	51.42 cm.	20.24 in.	65%	55.08 cm.	21.68 in.
5%	51.76 cm.	20.38 in.	70%	55.32 cm.	21.78 in.
10%	52.07 cm.	20.50 in.	75%	55.58 cm.	21.88 in.
15%	52.66 cm.	20.73 in.	80%	55.97 cm.	22.03 in.
20%	52.92 cm.	20.83 in.	85%	56.36 cm.	22.19 in.
25%	53.17 cm.	20.93 in.	90%	56.87 cm.	22.39 in.
30%	53.47 cm.	21.05 in.	95%	57.62 cm.	22.68 in.
35%	53.67 cm.	21.13 in.	97%	58.12 cm.	22.88 in.
40%	53.89 cm.	21.22 in.	98%	58.52 cm.	23.04 in.
45%	54.16 cm.	21.32 in.	99%	59.17 cm.	23.27 in.
50%	54.36 cm.	21.40 in.			

SAGITTAL ARC

Range: 31 to 48 cm.  
12.2 to 18.9 in.

N = 852

Mean:  $37.45 \pm .07$  cm.;  $14.74 \pm .03$  in.

Standard Deviation:  $2.15 \pm .05$  cm.;  $.85 \pm .02$  in.

Coefficient of Variation:  $5.75 \pm .14$  %

Percentile Values

1%	33.1 cm.	13.0 in.	55%	37.7 cm.	14.9 in.
2%	33.6 cm.	13.2 in.	60%	38.0 cm.	15.0 in.
3%	33.9 cm.	13.4 in.	65%	38.3 cm.	15.1 in.
5%	34.5 cm.	13.6 in.	70%	38.7 cm.	15.2 in.
10%	35.2 cm.	13.9 in.	75%	39.1 cm.	15.4 in.
15%	35.7 cm.	14.0 in.	80%	39.6 cm.	15.6 in.
20%	36.1 cm.	14.2 in.	85%	40.1 cm.	15.8 in.
25%	36.3 cm.	14.3 in.	90%	40.9 cm.	16.1 in.
30%	36.6 cm.	14.4 in.	95%	42.1 cm.	16.6 in.
35%	36.9 cm.	14.5 in.	97%	43.0 cm.	16.9 in.
40%	37.1 cm.	14.6 in.	98%	43.8 cm.	17.3 in.
45%	37.3 cm.	14.7 in.	99%	45.1 cm.	17.8 in.
50%	37.5 cm.	14.8 in.			

CORONAL ARC

Range: 30 to 41 cm.  
11.8 to 16.1 in.

N = 845

Mean:  $35.95 \pm .05$  cm.;  $14.15 \pm .02$  in.

Standard Deviation:  $1.57 \pm .04$  cm.;  $.62 \pm .01$  in.

Coefficient of Variation:  $4.36 \pm .11$  %

Percentile Values

1%	32.3 cm.	12.7 in.	55%	36.1 cm.	14.2 in.
2%	32.6 cm.	12.8 in.	60%	36.3 cm.	14.3 in.
3%	32.8 cm.	12.9 in.	65%	36.5 cm.	14.4 in.
5%	33.3 cm.	13.0 in.	70%	36.7 cm.	14.5 in.
10%	33.9 cm.	13.3 in.	75%	36.9 cm.	14.5 in.
15%	34.2 cm.	13.5 in.	80%	37.2 cm.	14.7 in.
20%	34.6 cm.	13.6 in.	85%	37.5 cm.	14.8 in.
25%	34.8 cm.	13.7 in.	90%	38.0 cm.	15.0 in.
30%	35.1 cm.	13.8 in.	95%	38.6 cm.	15.2 in.
35%	35.3 cm.	13.9 in.	97%	39.0 cm.	15.4 in.
40%	35.5 cm.	14.0 in.	98%	39.4 cm.	15.5 in.
45%	35.7 cm.	14.1 in.	99%	39.8 cm.	15.7 in.
50%	35.9 cm.	14.1 in.			

POSTERIOR ARC

Range: 21 to 49 cm.  
8.3 to 19.3 in.

N = 852

Mean: 31.63 ± .11 cm.; 12.45 ± .04 in.

Standard Deviation: 3.24 ± .08 cm.; 1.27 ± .03 in.

Coefficient of Variation: 10.24 ± .25 %

Percentile Values

1%	23.1 cm.	9.1 in.	55%	31.9 cm.	12.6 in.
2%	25.3 cm.	10.0 in.	60%	32.2 cm.	12.7 in.
3%	26.0 cm.	10.2 in.	65%	32.4 cm.	12.8 in.
5%	27.0 cm.	10.6 in.	70%	32.7 cm.	12.9 in.
10%	28.2 cm.	11.1 in.	75%	33.1 cm.	13.0 in.
15%	29.0 cm.	11.4 in.	80%	33.6 cm.	13.2 in.
20%	29.6 cm.	11.7 in.	85%	34.1 cm.	13.4 in.
25%	30.1 cm.	11.8 in.	90%	35.0 cm.	13.8 in.
30%	30.4 cm.	12.0 in.	95%	36.7 cm.	14.4 in.
35%	30.8 cm.	12.1 in.	97%	38.0 cm.	15.0 in.
40%	31.1 cm.	12.2 in.	98%	39.2 cm.	15.4 in.
45%	31.4 cm.	12.4 in.	99%	43.9 cm.	17.3 in.
50%	31.6 cm.	12.5 in.			

## Glossary

**Acromion** - the outer end of the transverse spine of the shoulder blade.

**Cervicale** - the projecting tip of the 7th neck vertebra (at the base of the neck).

**Distal** - towards the extremities.

**Frankfort Plane** - a plane of orientation for the head determined by locating the lower edge of the eye socket and the upper edge of the ear hole on a horizontal line.

**Glabella** - the most forward portion in the midline of the head between the brow ridges.

**Gluteal Furrow** - the furrow formed by the overhang of the buttock on the back of upper leg.

**Inion** - the tip of the occipital protuberance.

**Lateral Vastus Muscle** - the large muscle on the outside of the upper leg just above the knee.

**Medial Vastus Muscle** - the large muscle on the inner surface of the upper leg just above the knee.

**Metacarpale Bones** - the bones of the palm of the hand.

**Metatarsal Bones** - bones of the instep of the foot.

**Midsagittal Plane** - the plane dividing the body into equal right and left hand sections.

**Navicular Bone** - one of the small bones of the wrist; in particular the one closest to the hand on the same side as the thumb.

**Nuchal Musculature** - muscles of the neck.

**Occipital Region** - the back of the head.

**Patella** - the knee cap.

**Phalanges** - plural of phalanx.

**Phalanx** - one of the bones of the fingers or toes.

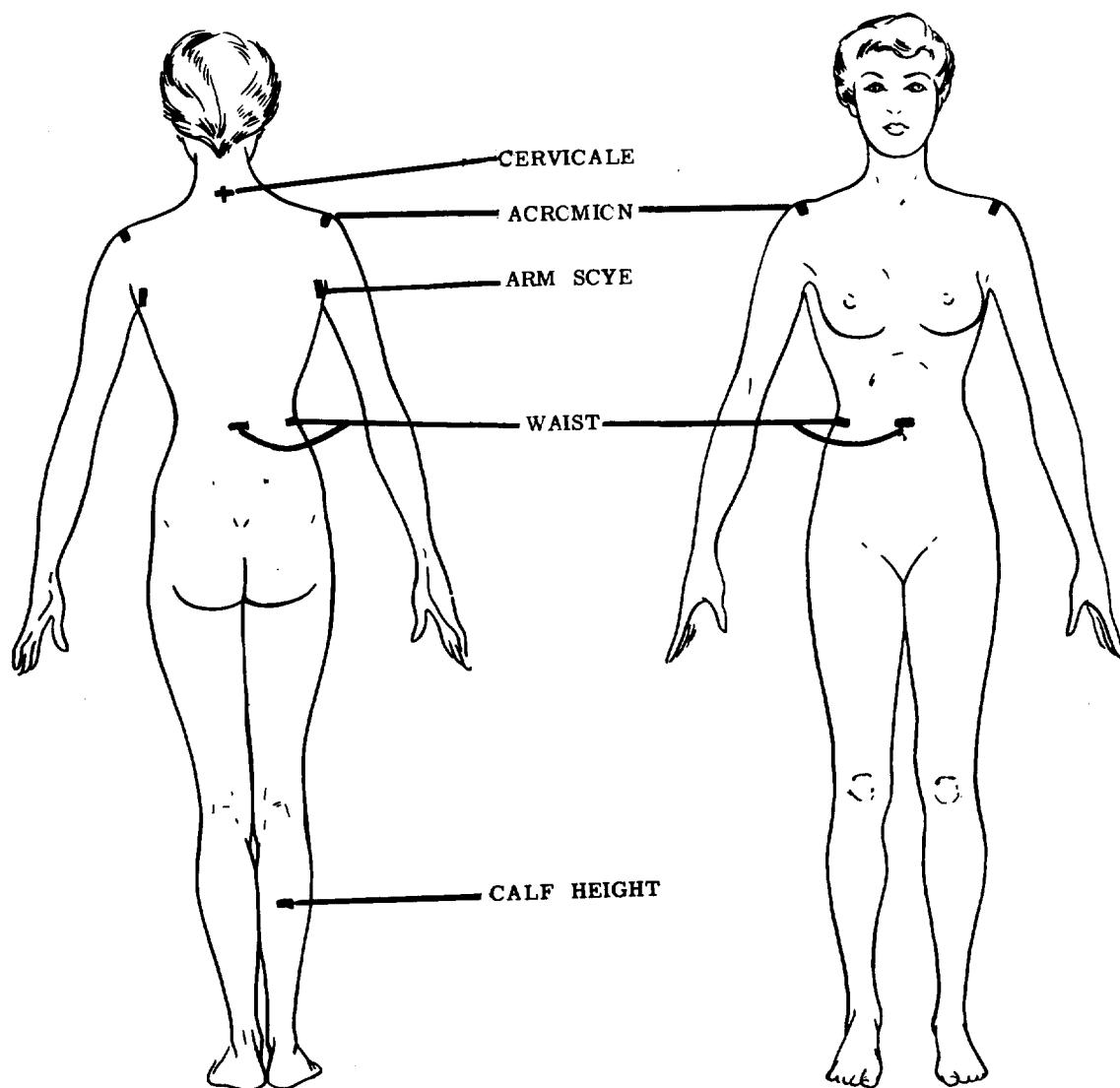
**Radius** - one of the bones of the lower arm running from the inside of the elbow to the thumb side of the wrist.

**Scye Points** - the tip of the crease between the arm and the body on the back; this corresponds to the location of the seam between the sleeve and the body of a garment.

**Styloid Process (Radius)** - the lateral projection at the distal end of the radius.

**Styloid Process (Ulna)** - the lateral projection at the distal end of the ulna.

**Suprasternale** - a point located at the middle of the upper edge of the breastbone.



**Figure 4 SCHEMATIC OF MARKED POINTS**

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Wrist Circumference . . . . .	21 . . . . .	67